

NOVEL POLYPEPTIDES AND NUCLEIC ACIDS ENCODING SAME**RELATED APPLICATIONS**

5 This application claims priority to USSN 60/171,746, filed December 22, 1999, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

10 Mammals are able to discriminate between thousands of odor molecules. This capacity
relies on a multigene family encoding 500 - 1000 olfactory receptors (ORX) *See* Buck et al.,
(1991) *Cell* **65**, 175-187. These receptors are expressed mainly in the olfactory epithelium and
have been found in a number of species including mammals, birds, amphibians, and fish. *See*
Buck et al., *supra*, (1991) *Cell* **65**, 175-187; Selbie et al., (1992) *Mol. Brain Res.* **13**, 159-163;
Rouquier et al., (1998) *Nature Genet.* **18**, 243-50.; Issel-Tarver et al., (1997) *Genetics* **145**, 185-
15 195; Sullivan et al., (1996) *Proc. Natl. Acad. Sci. USA* **93**, 884-888; Nef et al., (1992) *Proc. Natl.*
Acad. Sci USA **89**, 8948-8952; Leibovici et al., (1995) *Dev. Biol.* **175**, 118-131; Freitag et al.,
(1995) *Neuron* **15**, 1383-1392; Ngai et al., (1993) *Cell* **72**, 657-666.

20 All of these receptors belong to the G protein-coupled receptor (GPCR) superfamily and
share features of sequence and structure, such as seven hydrophobic transmembrane domains
(7TM).

 The sense of smell plays an important role in mammalian social behavior, location of
food and detection of predators. However, mammals vary in their olfactory ability. *See* Moulton
(1967) *Am. Zool.* **7**, 421-429; Stoddart (1980) *The ecology of vertebrate olfaction* (Chapman and
Hall, New York).

25 In primates, the sense of smell is greatly reduced (*i.e.*, microsmatic) with respect to
other mammals such as dogs or rodents. *See* Moulton, *supra*; Stoddart, *supra*; Issel-Tarver, L.,
Rine, J. (1996) *Proc. Natl. Acad. Sci. USA* **93**, 10897-10902.

 Various explanations for the differences in olfactory performance have been
hypothesized. Differences in the anatomical structures (size, location) devoted to olfaction could
30 partly explain these differences. For example, dogs, which have an olfactory sensitivity up to
100 times greater than humans, have on average ~100 cm² of olfactory epithelium while

humans have only 10 cm².

Variations in the size and diversity of the expressed ORX gene family could also account for these differences. It has recently been demonstrated that the human ORX gene repertoire is distributed in over 25 chromosomal sites. Over 70% of these ORX genes are pseudogenes, *i.e.* the sequences have accumulated deleterious mutations such as in-frame stop codons and/or indel frameshifts. See Rouquier et al., (1998) *Nature Genet.* **18**, 243-50. Thus, the reduction of the sense of smell observed in primates could parallel the reduction of the number of functional ORX genes.

SUMMARY OF THE INVENTION

The invention is based, in part, upon the discovery of novel polynucleotide sequences encoding novel polypeptides.

Accordingly, in one aspect, the invention provides an isolated nucleic acid molecule that includes the sequence an ORX nucleic acid molecule or a fragment, homolog, analog or derivative thereof. The nucleic acid can include, *e.g.*, a nucleic acid sequence encoding a polypeptide at least 80% identical to a polypeptide that includes the amino acid sequence of an ORX polypeptide. The nucleic acid can be, *e.g.*, a genomic DNA fragment, or a cDNA molecule.

Also included in the invention is a vector containing one or more of the nucleic acids described herein, and a cell containing the vectors or nucleic acids described herein.

The invention is also directed to host cells transformed with a vector comprising any of the nucleic acid molecules described above.

In another aspect, the invention includes a pharmaceutical composition that includes an ORX nucleic acid and a pharmaceutically acceptable carrier or diluent.

In a further aspect, the invention includes a substantially purified ORX polypeptide, *e.g.*, any of the ORX polypeptides encoded by an ORX nucleic acid, and fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition that includes an ORX polypeptide and a pharmaceutically acceptable carrier or diluent.

In still a further aspect, the invention provides an antibody that binds specifically to a ORX polypeptide. The antibody can be, *e.g.*, a monoclonal or polyclonal antibody, and

fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition including ORX antibody and a pharmaceutically acceptable carrier or diluent. The invention is also directed to isolated antibodies that bind to an epitope on a polypeptide encoded by any of the nucleic acid molecules described above.

5 The invention also includes kits comprising any of the pharmaceutical compositions described above.

 The invention further provides a method for producing an ORX polypeptide by providing a cell containing an ORX nucleic acid, *e.g.*, a vector that includes an ORX nucleic acid, and culturing the cell under conditions sufficient to express the ORX polypeptide encoded by the
10 nucleic acid. The expressed ORX polypeptide is then recovered from the cell. Preferably, the cell produces little or no endogenous ORX polypeptide. The cell can be, *e.g.*, a prokaryotic cell or eukaryotic cell.

 The invention is also directed to methods of identifying an ORX polypeptide or nucleic acid in a sample by contacting the sample with a compound that specifically binds to the
15 polypeptide or nucleic acid, and detecting complex formation, if present.

 The invention further provides methods of identifying a compound that modulates the activity of an ORX polypeptide by contacting an ORX polypeptide with a compound and determining whether the ORX polypeptide activity is modified.

 The invention is also directed to compounds that modulate ORX polypeptide activity
20 identified by contacting an ORX polypeptide with the compound and determining whether the compound modifies activity of the ORX polypeptide, binds to the ORX polypeptide, or binds to a nucleic acid molecule encoding an ORX polypeptide.

 The invention also provides a method for assessing the olfactory acuity of a subject by providing a biological sample comprising nucleic acids from the subject, identifying a plurality
25 of nucleic acid sequences homologous to an olfactory receptor nucleic acid sequence, determining the number of sequences containing open-reading frames, determining the number of sequences containing olfactory receptor pseudogenes, and comparing the number of open-reading frames to the number of pseudogenes to assess the olfactory acuity of the subject. In one embodiment, the invention provides a method of determining the plurality of nucleic acids using
30 a pair of primers that selectively amplify an olfactory receptor nucleic acid sequence. In a further

embodiment, this pair of primers includes OR5B-OR3B (OR5B (TM2), 5'-
CCCATGTGA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3'
(SEQ ID NO: 432) and 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ
ID NO:433). In a still further embodiment, the ratio of the number of sequences containing
5 open-reading frames to the number of sequences containing olfactory receptor pseudogenes is
calculated and compared to a reference ratio for an organism whose olfactory acuity is known.

Unless otherwise defined, all technical and scientific terms used herein have the same
meaning as commonly understood by one of ordinary skill in the art to which this invention
belongs. Although methods and materials similar or equivalent to those described herein can be
10 used in the practice or testing of the present invention, suitable methods and materials are
described below. All publications, patent applications, patents, and other references mentioned
herein are incorporated by reference in their entirety. In the case of conflict, the present
specification, including definitions, will control. In addition, the materials, methods, and
examples are illustrative only and not intended to be limiting.

15 Other features and advantages of the invention will be apparent from the following
detailed description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic phylogeny tree of the primate species used in the Examples.

20 FIG. 2 is a comparison of the deduced protein ORX sequences obtained from the different
primate species characterized. The dendrogram was established using the PileUp program from
the GCG Package. Percent amino acid similarity (ASI) was determined by pairwise sequence
comparisons using the Gap program and is indicated along the abscissa of the tree. Sequences
obtained from the literature are indicated by an asterisk. For example, human ORX sequences
25 derived from the use of the OR3B/OR5B primers and representing the main ORX families were
selected from Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum.*
Mol. Genet. 7, 1337-1345. Dog (CfOLF1 and its human counterpart HsOLF1; CfOLF2) and
chicken (COR4) sequences were selected from Issel-Tarver et al. (1997) *Genetics* 145, 185-195
and Leibovici et al., (1996) *Dev. Biol.* 175, 118-131, respectively. ORX families (greater than
30 40% ASI) are indicated by open circles and subfamilies (greater than 60% ASI) are indicated by

open squares. The main family was arbitrarily named family 1 and subdivided in two groups of subfamilies, 1-I and 1-II , which are indicated by ovals. Group 1-II further comprises subfamilies A and B. Beside each sequence name, black dots indicate sequences derived from the use of the OR3B/OR5B consensus primers, black squares those derived from the OR3.1/7.1 consensus primers, and black rectangles indicate potentially functional genes (uninterrupted ORFs). In the case of HSA 912-93 (black rectangle and double asterisk), the sequence contains only one nonsense point mutation in human, but potentially codes in other primates. See Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. In FIG. 2, the following abbreviations are used: human, HSA; chimpanzee, PTR; gorilla, GGO; orangutan, PPY; gibbon, HLA; macaque, MSY; baboon, PPA; marmoset, CJA; squirrel-monkey, SSC and SBO; lemur, EFU and ERU; zebrafish, DRE.

DETAILED DESCRIPTION OF THE INVENTION

Included in the invention are the novel nucleic acid sequences and their polypeptides. The sequences are collectively referred to as "ORX nucleic acids" or "ORX polynucleotides" and the corresponding encoded polypeptides are referred to as "ORX polypeptides" or "ORX proteins." Unless indicated otherwise, "ORX" is meant to refer to any of the novel sequences disclosed herein.

The ORX nucleic acids and polypeptides are described in more detail below.

OR1

LOCUS AF127814 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA13) gene, partial cds.
ACCESSION AF127814
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

 /organism="Papio hamadryas"

 /db_xref="taxon:9557"

gene <1..>649

 /gene="PPA13"

CDS <1..>649

 /gene="PPA13"

 /codon_start=2

 /product="olfactory receptor"

 /translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILG

 TLLLTVMAYDRFVAVCHPLHYITIMNPRLCGLLVFVTWLIGVMTSLLHISLMTHLTFC

 KDFEIPHFCELTHILQLACSDTFLNSTLIYVMTGVLGVFLLGIHFSYSRIASSIRK

 MSSSGGKEKALSTCGSHLSVVSFLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID

NO:1).

BASE COUNT 128 a 188 c 130 g 203 t

ORIGIN

1 ctgggttgac atctgttca gcacctgcat cgtccccaag atgctggtga acatccagac

61 caagaacaaa acgatttctt acatggactg cctcaccag gtctatttct ccatgtttt

121 tctattctg ggcacactac tctgaccgt gatggcctat gaccggttg tggcgcgtc

181 ccacccctg cactatataa ccatcatgaa ccccgccctc tgtggcctcc tggttttgt

241 cacgtggctc attggtgtca tgacgtccct cctccatatt tctctgatga cacatctaac

301 cttctgtaaa gattttgaaa ttccacatt ttctgcgaa ctgacacata tcctccagct

361 ggctgctct gatacttcc tgaacagcac gtgatatat gtatgacgg gtgtgctggg

421 cgttttccc ctcttgga tcattttctc ttattcacga atcgcttcat ccataaggaa

481 gatgtctca tctgggggaa aagagaaagc actttctacc tgtgctctc acctctccgt

541 cgttcttta ttatggga caggcattgg ggtccactc acttctgcgg tgactcattc

601 tcccagaac atctccgtgg cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:2).

OR2

LOCUS AF127815 642 bp DNA PRI 28-FEB-2000

DEFINITION Papio hamadryas PPA14 pseudogene, partial sequence.

ACCESSION AF127815

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

 Papio.

REFERENCE 1 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for

 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..642

 /organism="Papio hamadryas"

Category	Value
Age	18-24
Gender	Male
Ethnicity	White
Religion	Christian
Marital Status	Married
Education	High School
Income	\$10,000-\$15,000
Occupation	Unemployed
Health Status	Good
Smoking	Non-smoker
Alcohol	Occasional
Exercise	Regular
Stress	Low
Sleep	7-8 hours
Diet	Healthy
Family Size	2-3
Home Ownership	Rent
Vehicle	None
Travel	Domestic
Shopping	Online
Technology	Smartphone
Work Hours	Full-time
Job Satisfaction	Low
Work-Life Balance	Poor
Community Involvement	Low
Volunteering	None
Charitable Giving	None
Political Views	Conservative
Environmental Concern	Low
Climate Change Belief	Skeptical
Renewable Energy Support	Low
Carbon Footprint Awareness	Low
Waste Recycling	Low
Water Conservation	Low
Energy Efficiency	Low
Green Building Interest	Low
Sustainable Living	Low
Ethical Consumerism	Low
Local Food Consumption	Low
Organic Food Purchase	Low
Plant-Based Diet	Low
Animal Welfare	Low
Human Rights	Low
LGBTQ+ Support	Low
Racial Equality	Low
Gender Equality	Low
Immigration Views	Low
Trade Policy	Low
Globalization	Low
International Relations	Low
Foreign Aid	Low
Peacekeeping	Low
Disarmament	Low
Nuclear Energy	Low
Space Exploration	Low
Art Collection	None
Music Taste	Pop
Movie Preferences	Action
TV Shows	Drama
Video Games	None
Reading Habits	None
Podcast Consumption	None
YouTube Channel	None
Social Media Usage	Low
Instagram	Low
Facebook	Low
Twitter	Low
LinkedIn	Low
WhatsApp	Low
Telegram	Low
Signal	Low
Other	Low

ORIGIN

10

20

25

ORGANISM *Papio hamadryas*

30

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35

REFERENCE 2 (bases 1 to 649)

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

40

source 1..649

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CDS <1..>649

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7

BASE COUNT 130 a 188 c 128 g 203 t

ORIGIN

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121 tcctattctg gacacactac tctgaccgt gatggcctat gaccggttg tggcgtctg
181 ccacccctg cactatataa ccatcatgaa ccccgctc tgggctcc tggttttgt
241 cacgtggctc attggtgtca tgacatccct cctccatatt tctctgatga cacatctaac
301 cttctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacata tcctccagct
361 ggctgctct gatacttcc tgaacagcac gttgatatat gttatgacgg gtgtgctggg
421 cgttttccc ctcttggga tcatttctc ttattcaga atcgctcat ccataaggaa
481 gatgtctca tctgggggaa aagagaaagc actttctacc tgtggtctc acctctcgt
541 cgtttttta ttatggga caggcattgg ggtccacttc acttctgagg tgactcattc
601 ttccagaac atctcgtgg cctcgtgat gtacacggtg gttaccccc (SEQ ID NO:5).
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OR4

LOCUS AF127817 649 bp DNA PRI 28-FEB-2000

DEFINITION Papio hamadryas olfactory receptor (PPA16) gene, partial cds.

ACCESSION AF127817

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>649

/gene="PPA16"

CDS <1..>649

/gene="PPA16"

/codon_start=2

/product="olfactory receptor"

/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD

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IKMEIPHFCDLPEVLKLACSDTFINNVVIYFATGILAVIPFTGILFSYYKIVFSVLR

ISSAGGKYKAFSTCGSHLSMVSLFYGTGLGVYLSSAIPSSRTSLVASVMYTMVTP" (SEQ ID

NO:6).

BASE COUNT 130 a 176 c 136 g 207 t

ORIGIN

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 241 atcctggtgc atcagtgtca tgggttcct gcttgagacc ttgactgttt tgaggctgtc
 301 cttctgcatc aaaatggaaa ttccacactt ttttgtgat ctctctgaag tctgaagct
 361 cgcctgttct gacaccttca tcaataatgt agtgatatac ttgcaactg gcattctggc
 421 tgtgattccc ttactggaa tacttttctc ttactataaa atgttttct ctgtactgag
 481 gatttctca gctgggggaa agtacaaagc ctttccacc tgtggtccc acctctcaat
 541 ggtcagcttg ttctatggca cgggccttgg ggtctatctc agttctgcag ctataccatc
 601 ttctaggaca agtctggtgg cctcagtgat gtacacatg gtcaccccc (SEQ ID NO:7).

OR5

LOCUS AF127818 649 bp DNA PRI 28-FEB-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA41) gene, partial cds.
 15 ACCESSION AF127818
 KEYWORDS .
 SOURCE baboon.

ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 20 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

30 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

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CDS <1..>649

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/product="olfactory receptor"

/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD

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KDFEIPHFCELTILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK

45 MSSSGGKEKALSTCGSHLSVVSFLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID

NO:8).

BASE COUNT 130 a 188 c 128 g 203 t

ORIGIN

1 ctgggttgac atctgtttca gcacctgcat cgtccccaag atgctggtga acatccagac
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 121 tcctattctg gacacactac tctgaccgt gatggcctat gaccggttg tggccgtctg
 181 ccacccctg cactatataa ccacatgaa cccccgctc tgtggcctcc tggttttgt
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 481 gatgtcctca tctgggggaa aagagaaagc actttctacc tgtggtctc acctctccgt
 541 cgtttcttta tttatggga caggcattgg ggtccacttc acttctcgg tgactcattc
 601 ttccagaac atctccgtgg cctcgtgat gtacacggtg gttaccccc (SEQ ID NO:9).

OR6

LOCUS AF127819 649 bp DNA PRI 28-FEB-2000

DEFINITION Papio hamadryas olfactory receptor (PPA42) gene, partial cds.

ACCESSION AF127819

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

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/db_xref="taxon:9557"

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/gene="PPA42"

CDS <1..>649

/gene="PPA42"

/codon_start=2

/product="olfactory receptor"

/translation="LVDFCLATNTIPKMLVSLQTRSKAISYPCCLTQMYFFHFFGIVD

SIHAMMAYDRFVAICHPLHYATIMSPRLCGLLVGVPWAFSCFISLTHILLMARLVFC

GSHEVPHYFCDLTPILRLSCTDTSVNRIFILIVAGMVIATPFICILASYARILAAIMK

VPSAGGRKKAFSTCSSHLSVVALFYGTTIGVYLCSSVRTAVKEKASAVMYTAVTP" (SEQ ID

NO:10).

BASE COUNT 111 a 224 c 146 g 168 t

ORIGIN

1 cctggtgat ttctgtctgg ccaccaacac catccccaag atgctggtga gcctcaaac
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 121 cggcatcgtg gacagcatca taatgccat gatggcttat gaccggttcg tggccatctg
 181 ccaccggtg cactacgcca ccatcatgag ccacgcctc tgtggtctgc tggcggcgt
 241 ccctggggcg ttttctgct tcattctctt caccacatc ctctgatgg cccgcctcgt
 301 ttctgcggc agccacgagg tgcctcacta ctctgcgac ctactcca tcctccgact
 361 ttctgcaca gacacatcag tgaacaggat ctctatctc attgtggcag ggatggtgat
 421 agccacgccc ttcatctgca tcttgcttc ctatgctgc atccttgcgg ccatcatgaa
 481 ggtccctct gcaggcgga ggaagaaagc ctctccacc tgcagctccc acctgtctgt
 541 ggtgtctctc ttctatgga ccaccattgg tctctatctg tctcctct cgttcgcac

601 ggctgtgaag gagaaagctt ctgccgtgat gtacacagca gtcaccccc (SEQ ID NO:11).

OR7

5 LOCUS AF127820 641 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas PPA43 pseudogene, partial sequence.
ACCESSION AF127820
KEYWORDS .
SOURCE baboon.
10 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 641)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 641)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..641
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>641
/gene="PPA43"
30 /pseudo
BASE COUNT 126 a 172 c 123 g 220 t
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1 cttgcctgac atcagtttca ccttgcccat ggtccccaag atgattgtgg acatgcaatc
61 gcatagcaga gtcattctccc acgcggactg cctggcacag atgtcttctt ttgtcctttt
35 121 tgcatgtata gatgacatgc tcctgactgt gatggcctat aactgatttg tggccatctg
181 tcacccctg cactaccag tcatcatgaa tctcacttc tgtgtcttct tagttttggt
241 gtcttttctg tcagcgtgtt ggattcccag ctgcacaatt tgattgtgtt acaacttacc
301 tgcctcaatg atgtggaaat ctctaaattt ttctgtgacc ctctcaact tctcaatcct
361 agcctgctct gacacataac atagtcgtat attttattgg taccatattt ggttttcttc
40 421 ctctctcagg gatccttttc ttactata aaattgttcc ctccattccg agagtgcgct
481 ctcaggttag gaagtataaa gccttctcca cctgcagctc tcaccttca gttgtttgct
541 tattttatgg aacagccctt ggagggtacc tcagttcagc tgtctctctc cccccagga
601 aggggtgcagc ggcctcagtg atgtacatgg tggtcacccc c (SEQ ID NO:12).

OR8

45 LOCUS AF127821 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA68) gene, partial cds.
ACCESSION AF127821
50 KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>649
/gene="PPA68"
CDS <1..>649
/gene="PPA68"
/codon_start=2
/product="olfactory receptor"
/translation="FIDVCFVSTTPKMLVNIQTQSRVITYAGCITQMCFFIFFAGLD
IFMLTVMAYDRFVAICHPLHYTVTMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
ADLEIPHFCELNQVVHLACSDTFLNDMVMYLASALLGGGALSGLYSYSKIVSSIRG
TSSAQGKYKAFSTCASHLSVVSFLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID

NO:13).
BASE COUNT 122 a 177 c 146 g 204 t
ORIGIN
1 cttcatagac gtctgttttg tgcaccacac tgcctcgaag atgctggtga acatccagac
61 acagagcaga gtcacacac atgcaggctg catcaccacag atgtgctttt tcataattct
121 tgcgggactg gatactttta tgcctaccgt gatggcctat gacagggttg tggccatctg
181 tcacccctg cactacacgg tcaccatgaa cccaggctc tgggactgc tggctctggc
241 gtcttgatc atgagtgcac tgaattcttc gtgcaaagc ttaattggtat tgcaccttc
301 cttctgtgca gacttgaaa ttcccaactt ttctgtgaa cttaatcagg tggccacac
361 tgcctgttct gacaccttc ttaatgacat ggtgatgtat ttggcatctg cgctgctggg
421 cgggtggtgc ctctctggga tctttattc ttattctaag atcgcttctc ccatacgtgg
481 aacctcgtca gtcagggga agtacaaggc atttccacc tgtcatctc acctctcgg
541 tgtctcctta tttatgga cgctcctagg agtgacttt agttctgctg caaccgtaa
601 ctcacactca agtgctgcag cctcgggtat gtacactgtg gttaccccc (SEQ ID NO:14).

OR9

LOCUS AF127822 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA72) gene, partial cds.
ACCESSION AF127822
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
10 /organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>649
/gene="PPA72"
CDS <1..>649
15 /gene="PPA72"
/codon_start=2
/product="olfactory receptor"
/translation="FIDICFVSTTVPKMLVNIQTQSRVITYAGCITQMCFFIFFAGLD
20 IFMLTVMAFDRFVAICHPLHYTVTMNPKLCGLLVLASWIMNALNSSLQSLIVLRLSFC
TDLEIPHFFCELNQVVHLACSDTFLNDMGM MYMASALLGGGALSGILYSYSKILSSIRG
TSSAQGKYKAFSTCASHLSVVSFLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID
NO:15).
BASE COUNT 124 a 179 c 144 g 202 t
ORIGIN
25 1 cttcatagac atctgtttg tgtccaccac tgtccgaag atgctggtga acatccagac
61 acagagcaga gtcacacct atgcaggctg catcaccag atgtgcttt tcatattct
121 tgcgggactg gatatcttta tgcagaccgt gatggccttt gaccggttg tggccatctg
181 tcacccctg cactacacgg tcacatgaa cccaagctc tggggctgc tggttctggc
241 gtcttgatc atgaatgcc tgaattctc gttacaaagc ttaatagtgc tgcggcttc
30 301 ctctgcaca gacttgaaa ttcccactt ttctgtgaa ctaatcagg tggtcacac
361 tgctgttct gacaccttc ttaatgacat ggggatgtat atggcatctg ctctgctggg
421 cgggtggtgcc ctctctggga tcctttatc ttattctaag atccttctc ccatcgtgg
481 aacctcgtca gctcaggga agtacaagc atttccacc tgtcatctc acctctcgtg
541 tgtctcttta tttatgga cgctcctagg agtgacttt agttctgctg caactcgtaa
35 601 ctacactca agtctgcag cctcgggtgat gtacacggtg gttaccccc (SEQ ID NO:16).

OR10

LOCUS AF127823 649 bp DNA PRI 28-FEB-2000
40 DEFINITION Papio hamadryas olfactory receptor (PPA79) gene, partial cds.
ACCESSION AF127823
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
45 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 5 source 1..649
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>649
 /gene="PPA79"
 10 CDS <1..>649
 /gene="PPA79"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDVSYATSIVPQLLAHFLAEHKAISLQSCAAQLFFSLALGGIE
 15 FVLLAVMAYDRYVAVCDPLRYSATMHGALCAKLAITSWVSGSINSLMHTTITFQLPMC
 TNKFINHIFCEILAVIRLACVDTSNEVTIMVSSIVLLMTPLCLVLLSYIRIISTILK
 IQSREGRRKAFHTCASHLTVVALCYGMAIFTYIHPHSSPSVLQEKLSLFYAILTP" (SEQ ID

NO:17).

BASE COUNT 135 a 185 c 133 g 196 t

ORIGIN

1 cctgtcgat gtctctatg ccacaagcat agtcctcag ctgctggcac atttcttgc
 61 agaacataaa gccatctcgt tgcagagctg tgcagccaa ttattttct ccctggcctt
 121 ggggtgggatt gagttgttc tcttggcagt gatggcctat gaccgctatg tggctgtgtg
 181 tgacccctg cgatactcag ccacatgca tggagcgcta tgtgctaagt tggccatcac
 241 atcctgggtc agtggatcca ttaactctct catgcatacc accatcacct ttcagctgcc
 301 catgtgcaca aacaagtta ttaatcatat attctgtgaa attctagctg tgcacaggct
 361 ggcttgtgtg gacacctcct ccaacgaggt caccatcatg gtgtctagca ttgtcttct
 421 gatgacaccc ttatgtctgg ttctttgtc ttacatcggg atcatctcca ccatctaaa
 481 gatccagtc agagaaggaa ggaggaaagc cttccacag tggtcctctc acctcacagt
 541 ggttgccctg tgctatggca tggccatttt cacttacatc catccccact ccagtcctc
 601 tgccttcag gagaagtga tctctctct ttatgccatt tgacacca (SEQ ID NO:18).

OR11

35 LOCUS AF127824 649 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes olfactory receptor (PTR12) gene, partial cds.
 ACCESSION AF127824
 KEYWORDS .
 SOURCE chimpanzee.
 40 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 45 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 50 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649

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/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene      <1..>649
/feature   /gene="PTR12"
CDS       <1..>649
/feature   /gene="PTR12"
/feature   /codon_start=2
/feature   /product="olfactory receptor"
/feature   /translation="FLEIGFNLVIVPKMLGTLTLLAQDTTISFLGCATQMYFFFFFFGVAE
CFLLATVAYDRYVAICSPPLHYPVIMNQRTAKLAAASWFGFPVATVQTTWLFSFPFC
RTNKNVNHFFCDSPVLRVLCADTALFEIYAIYVGTILVVMIPCLLILCSYTRIAAAILK
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NO:19).

BASE COUNT	132 a	193 c	129 g	195 t
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ORIGIN

1 ttctctggag attggcttca acctagtcac tgtgcccaaa atgtctggga cctctgtgc
61 ccaggacaca accatctcct tcttggctg tgccactcag atgtattct tcttctctt
121 tggagtgtct gaattgttcc tcttggctac cgtggcatat gaccgctatg tggccatctg
181 cagtcccttg cactaccag tcacatga ccaaaggaca cgggccaaac tggctgtctc
241 ctctgtgttc ccagggttcc ctgtagctac tgtgcagacc acatggctct tcagtttcc
301 attctgtgc accaacaagg tgaaccact ctctgtgac agccaccctg tctgagggt
361 ggtctgtgca gacacagcac tgtttgagat ctacgccatc gtcggaacca tctgtgtgt
421 catgataccc tcttgtctga tcttgtgttc ctatactgc atttgcctg ccatctcaa
481 gatccataca gctaaaggga agaataaagc cttttctca cgttctcac acctcttgt
541 tgtctctctt ttctatatat cattaaggct cacataatt cggcctaatt caaataattc
601 tcttgagggc aagaagctgc tatcgttgtc ctacactgtt atgactccc (SEQ ID NO:20).

OR12

LOCUS AF127825 650 bp DNA PRI 28-FEB-2000

DEFINITION Pan troglodytes PTR2 pseudogene, partial sequence.

ACCESSION AF127825

KEYWORDS

BASE COUNT 127 a 202 c 131 g 190 t

ORIGIN

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1 ctttgggac atctgttct cctccaccac cgtccccaag atgctggcca atcacatact
61 cgggactcag accatctcct tctgtggctg ttccacacag atgtatttcg tttcatgct
121 tgtggacatg gacaattcc tctagctgt gatggcctat gaccgcttg tgcgctgtg
181 ccaccctta cattacacag caaagatgac ccatcagctc tgtgccctgc tgggtgctgg
241 attatgggtg gttgccaacc tgaatgtcct tctgcacacc ctgctgatgg ctcgactctc
301 attctgtgca gacaatgccca tccctcactt ctctgcat gtgactcccc tactgaaact
361 ctctgtctca gacacacacc tcaatgaggt cataatcctt agtgagggtg ccttggtcat
421 gatcacccca tttcttgca tcttggttc ttatagcac atcacctgca ctgtctgag
481 ggtcccatcc acaaaggga ggtggtgtaagc ctctccacc tgtggtctc acctggctgt
541 ggttctacct ctctatggc accatcattg ctgtgtatt taacctctg tctccact
601 cagcagagaa agacactacg gctactgtgt gtatacagt agtgactccc (SEQ ID NO:21).
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OR13

LOCUS AF127826 649 bp DNA PRI 28-FEB-2000

DEFINITION Pan troglodytes PTR3 pseudogene, partial sequence.

ACCESSION AF127826

KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Pan troglodytes"

/db_xref="taxon:9598"

gene <1..>649

/gene="PTR3"

/pseudo

BASE COUNT 146 a 166 c 121 g 216 t

ORIGIN

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121 tgcagtggca gaaacattca tgctggcagt gatggcctat gattgatacg tggcagtgtg
181 taaccctttg ctctacacag ttgtcaggtc ccagaaactc tgtcatcat tagtggcagg
241 gccctacaca tggggataaa tctcttctct gacactcacc tatttctct tgcattatc
301 ctctgtggg tctaactca tcaataatt tgtctgtgag gactctgtca tcattctgt
361 ctctgtctct gaccttaca tcagccaaat gcttgtttt gtcattgcaa tattcaatga
421 ggtgagcagc ttgggagtca tctctactac ctatatitc atctttattg ctgtcataaa
481 aatgccttct gctgtgggc accaaaaagc ttctctacc tgtgcttccc acctgactgc
541 catcactatt ttcatggga ctgtcctgtt cctttattgt gtacccaact ccaaaaactc
601 atggctcata gtcaaagtag gttctgtgtt ttatacagtc atcatcccc (SEQ ID NO:22).
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OR14

LOCUS AF127827 651 bp DNA PRI 28-FEB-2000
5 DEFINITION Pan troglodytes PTR4 pseudogene, partial sequence.
ACCESSION AF127827
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..651
/organism="Pan troglodytes"
25 /db_xref="taxon:9598"
gene <1..>651
/gene="PTR4"
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BASE COUNT 131 a 166 c 134 g 220 t
30 ORIGIN
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61 tcacagcaga gtcattctct atgcaggctg cctgactcag atgtctctct ttgccatttt
121 tggagggtatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg ttgtagacca
181 tctgtcacct atatcggtca gccatctta acccgtgttt ctgtggcttc ctagatttgt
35 241 tgtctttttt tttttctca gtccttcaga ctcccagctg cacaacttga ttgccttaca
301 aatgacctgc ttcaaggatg tggaaattcc taatttcttc tgggaacctt ctcaactctc
361 ccatcttgca tgtgtgaca ccttcaccag gaacatcagt atttcctgc tgccatattt
421 gggtttcttc ctatctcaca gatcatttct tctactata aaattgttcc ctccatgctg
481 agtgtttcat catcagggtg gaagtataaa gccttctcca actgtgggtc tcccctgtca
40 541 gttgtttgct tattttatgg gaaaggcatt ggggggtacc tgagttcaga tgtgtcatct
601 tccccagaa aggggtcagt ggcctcagtg atgtacacgg tgataccgc c (SEQ ID NO:23).

OR15

45 LOCUS AF127828 657 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR5 pseudogene, partial sequence.
ACCESSION AF127828
KEYWORDS .
SOURCE chimpanzee.
50 ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 657)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 10 source 1..657
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>657
 /gene="PTR5"
 15 /pseudo
 BASE COUNT 128 a 173 c 137 g 219 t
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 1 cttgcctgac atcggttca cctccagcat ggtccccaag atgattgtgg acatccagtc
 61 tcacagcaga ctcatctct aggcaggctg cctgactccg atgtccctct ttgccatttt
 20 121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctattaccg ttgtggcca
 181 tctgtcacc tatatatcat tcaacctca tgaacccgtg ttctgtggc ttctagttt
 241 tgtgtcttt ttttttct cagtcttta gacgccagc tgcacaact gattgcctta
 301 caaatgacct gctcaagga tgtggaaatt cctaattct tctgggaacc ttctcaact
 361 ccccatctg catgttgca caccctacc aataacataa tcattgatt ccctgctgcc
 25 421 atattgggt ttctcccat ctgggggacc ctttctctt attataagat tgttctctc
 481 attctgaggg ttcatcatc aggtgggaag tataaggcct gtccacctg tgggtctcac
 541 ctgtcagtg ttgctgatt ttatggaaga tgcgtggag ggtacctag ttcatgtg
 601 tcattctcc tgagatagc tgcagtggc tcagtgatg acacggtgt caccctc (SEQ ID NO:24).

OR16

LOCUS AF127829 657 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes PTR6 pseudogene, partial sequence.
 ACCESSION AF127829
 35 KEYWORDS .
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 40 REFERENCE 1 (bases 1 to 657)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 45 REFERENCE 2 (bases 1 to 657)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 50 FEATURES Location/Qualifiers
 source 1..657
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>657

541 ttgtttgctt attttatgga acagcccttg gagggtagct cagttcagct gtgtcccttt
601 cctccaggaa ggggtgcagt gcctcagtga tgtacatggt ggtcaccccc (SEQ ID NO:26).

OR18

LOCUS AF127831 663 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR8 pseudogene, partial sequence.
ACCESSION AF127831
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 663)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 663)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..663
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>663
/gene="PTR8"
/pseudo
BASE COUNT 129 a 171 c 139 g 224 t
ORIGIN
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61 tcacagcaga gtcatttctc atgcaggctg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgtcctga atgtgacggc ctatgaccgg ttgttagcca
181 tctgtcaccc tctatatcgt tcagccatct tgaaccctg tttctgtggc ttctaggtt
241 tttgtcttt gattttttt tttttctcag tcttttagac tcccagctgc acaactgat
301 tgccttaca atgacctgct tcaaggatgt ggaaattcct aatttctcc gggaaccttc
361 tcaactcccc catcttgcac gttgtgacac ctactagg aacatcaaca tgtattttct
421 tgctgccata ttgggtttc ttccatctc ggggaccctt ttctctact gtaaaattgt
481 ttctccatt ctgagggtt catcatcagg tgggaagtat aaaccttcac cacttgtggg
541 tctcacctgt cagttgttg ctgattttat ggaacaggcg ttggagggtta cctcggttca
601 gatgtgcat ctccccgag aaagggtgca gtggcctcag tgatgtacac ggtggtcacc
661 ccc (SEQ ID NO:27).

OR19

LOCUS AF127832 677 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR9 pseudogene, partial sequence.
ACCESSION AF127832
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 677)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 677)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..677
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>677
/gene="PTR9"
/pseudo
BASE COUNT 129 a 170 c 143 g 235 t
ORIGIN
1 cttgactgac atcggtttca cctccatcac agtccccaag atgattgtgg acatctagtc
61 tcacagcaga gtcattgct atgcagggtg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatggccgg ttgtagcca
181 tctgtcaccc tccatattcg tcagccattt tgaaccctg tttctgtggc ttctagatt
241 tgtgtcctt gttttttt gttttttt gtttttct caggctttta gactccacg
301 tgcacaactt gattgcctta caaatgacgt gtttcaagga tgtggaaatt cctaatttct
361 tctgggaacc ttctcaactt gcccatcttg catgttgtaa caccttcacc aggaatatca
421 acctgtattt ccttctctcc gtatttgggt ttcttcccat ctcggggacc cttttctct
481 actgtaaaat tgtttctctc attctgaagg ttcatcatc aggtgggaac tataaagcct
541 tctccaccctg tgggtctcac ctgtcagttg ttgcttatt ttatggaaca ggcgttggag
601 ggtacctcag ttcatgtgtg tcattctccc ccagaaaggg tgcagtggcc tcagtgtgt
661 acacggtggt caccccc (SEQ ID NO:28).

OR20

LOCUS AF127833 643 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA45 pseudogene, partial sequence.
ACCESSION AF127833
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 643)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 643)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers

source 1..643
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>643
/gene="HLA45"
/pseudo

BASE COUNT 131 a 168 c 127 g 217 t

ORIGIN

1 ctgggctgac atcactttca cctcggccat ggttcccaag atggtgtgg acatgcagtc
61 gcatagcaga gccatctct atgcaggctg cctgacacag atgtcttct ttgtccttt
121 gcatgtatag aagacatgct cctgactctg atggcctatg accgatttgt ggccatctgt
181 caccctctgc actaccagct catcgtgaat cctcacctct gtgtcttctt agttttgttg
241 tctttttcc tagcctgtt ggattcccag ctacacagct ggattgtgtt tacaattcac
301 cttcttcaag aatggaaatc tctaatttt tctgtgaccc gtctcaact ctcaacctg
361 cctgttctga cagcatcatc gataacatat tataatatta gatagcccta tatttggtt
421 tcttccatt tcagggatcc tttgtctta gtataaaatt gtctcccca ttccgagaat
481 tccatcatca gatgggaagt ataaagcctt ctccacctgt ggctctcacc tggcagttgt
541 tgcattttat gaaacaggca ttggcgtgta cctgacttca gctgtgcat catccccag
601 gaatggtgtg gtggcgtcag tgatgtatgc tgtggtcacc ccc (SEQ ID NO:29).

OR21

LOCUS AF127834 648 bp DNA PRI 28-FEB-2000

DEFINITION Hylobates lar HLA46 pseudogene, partial sequence.

ACCESSION AF127834

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>648
/gene="HLA46"
/pseudo

BASE COUNT 131 a 170 c 143 g 204 t

ORIGIN

1 ctggtcgcac atctgtttca cctccaccac gatgcccaag atgttggtga acatccaggc
61 acagactcaa tccatcagtt acacaggctg cctcacccaa atctgctttg tcttggttt
121 tgttggtatt gaaaatggaa ttctgtcat gatggcctat gatcgatttg tggccatctg
181 tcaccactg aggtacaatg tcatcatgaa ccctaaactct gtgggctgct gcttctgctc
241 tcttcatca ttagtgtctt ggacgtctg ctgcacacgt tgatggtgct acggctgacc

301 ttctgcacag acctggaaat tccccacttt ttctgtgaac tagctcatgt tctcaagctc
 361 gcctgttctg atgtctctcat taataacatc ctggtgtatt tggtagaccgg cctgttaggt
 421 gttgttcctc actctgggat cattttctct tacacacgaa ttgcctcctc tgcctgaaa
 481 attccattag ctggttgaaa gtataaagct tttccatct gcgggtcaca cttaatcgtc
 541 gtttctgt tctatggaac agggtttggg gtgtacctta gttctggggc tacccactcc
 601 tctaggcagg gtgcaatagc atcagtgatg tataccgtgg tcaccccc (SEQ ID NO:30).

OR22

LOCUS AF127835 660 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar HLA47 pseudogene, partial sequence.
 ACCESSION AF127835
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 660)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 660)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..660
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>660
 /gene="HLA47"
 /pseudo
 BASE COUNT 127 a 182 c 137 g 214 t
 ORIGIN
 1 ctgcctgac atcggttca ctccaccac agtcccaag attattgtg acatcaaac
 61 tcacagcaga gtcattcct aggcaggctg cctgactcag acctctctc ttgccattt
 121 tggaggcatg gaagagagac acgtcctga gtgtgatggc ctatgaccgg ttgtagcca
 181 tctgtcacc tctatatcat tcggccatga tgaacccgtg ttctgcggc ttctagtt
 241 tgtgtcttt ttttttct tctcagtct ctagactccc agctgcacaa ctgattgcc
 301 ttgctaacga cctgcttcaa gggtagcgaa attcctaatt tctctgtga cccttctcaa
 361 ccccccatc ttgcatgtt tgacacctc accaataaca taatcatgta tttcctgct
 421 gccgtattg ggttcttcc catctcggg acccttctc ctactataa aatggttcc
 481 tcattctga ggttctcgc gtcagggtgg aagtataaag ccttctccac ctgtgggtc
 541 catctgtcag ttgttctg agttatgga agaggcgtg gaggatacct cagttcagat
 601 gtgtcctct ccccgaaaa ggtgcagtg gcctcagtg tgtacacgtt ggtcaccctc (SEQ ID NO:31).

OR23

LOCUS AF127836 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA48) gene, partial cds.
 ACCESSION AF127836
 KEYWORDS .

SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

5 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

15 FEATURES Location/Qualifiers
 source 1..649
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>649
 /gene="HLA48"
 CDS <1..>649
 /gene="HLA48"
 /codon_start=2
 /product="olfactory receptor"
 /translation="WVDICFGTCHPKMLVNIQTKNKAISYMDCLTQVYFSMLFPILD
 TLLLTVMAYDRFVAICHPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC
 KDFEIPHFFCELTHILQLARSDTLNSTLIYFMTGVLGVFPLLGIIFSYSRIASSIRK
 MSSSGGKQKALSTCGSHLSVVSFLFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID
 NO:32).

30 BASE COUNT 133 a 190 c 124 g 202 t
 ORIGIN
 1 ctgggtgac atctgttgc gcaactgcat catccccaag atgctggtga acatccagac
 61 caagaacaaa gccatctcct acatggactg cctcacacag gtctatttct ccatgctttt
 121 tectattctg gacacgctac tctgaccgt gatggcctat gaccggttg tggccatctg
 35 181 ccacctctg cactacatga tcatcatgaa cccccgctc tgtggcctcc tgattttgt
 241 catctggctc attggtgtca tgacatcct cctccatatt tctctgatga tgcactaat
 301 ctctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacaca tctccagct
 361 ggcccgctct gatacttcc tgaacagcac gttgatatac ttatgacag gtgtgctggg
 421 cgttttccc ctcctggga tcatttctc ttattcacga attgctcat ccataaggaa
 40 481 gatgtcctca tctgggggaa aacaaaaagc acttccacc tgtgggtctc acctctccgt
 541 tgtttctta tttatggga caggcattgg ggtccacttc acttctgcag tgactcacgc
 601 ttccagaaa atctccgtg cctcggtgat gtacactgtg gtcaccccc (SEQ ID NO:33).

OR24

45 LOCUS AF127837 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA5) gene, partial cds.
 ACCESSION AF127837
 KEYWORDS .

50 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>649
 /gene="HLA5"
 CDS <1..>649
 /gene="HLA5"
 /codon_start=2
 /product="olfactory receptor"
 /translation="WVDICFSTCIIPKMLVNIQTKNKAISYMDCLTQVYFSMLFPILD
 TLLLTVMAYDRFVAICLPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC
 KDFEIPHFCELTHILQLACSDTFLNSTLIYFMTGVLGVFPLLGIIFSYSRIASSIRK
 MSSSGGKQKALSTCGSHLSVVSIFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID
 NO:34).
 BASE COUNT 133 a 189 c 124 g 203 t
 ORIGIN
 1 ctgggtgac atctgttca gcacttgcac catccccaag atgctggtga acatccagac
 61 caagaacaaa gccatctcct acatggactg cctcacacag gtcatttct ccatgcttt
 121 tctattctg gacacgctac tctgaccgt gatggcctat gaccggttg tggccatctg
 181 cctccctctg cactacatga tcatcatgaa cccccgcctc tgtggcctcc tgattttgt
 241 catctggctc attggtgtca tgacatcct cctccatatt tctctgatga tgcactaat
 301 cttctgtaaa gattttgaaa ttccacatt ttctgcgaa ctgacacaca tctccagct
 361 ggctgctct gatacttcc tgaacagcac gttgatatac ttatgacag gtgtgctggg
 421 cgtttttccc ctctctggga tcatcttc ttttcacga attgcttcat ccataaggaa
 481 gatgtctca tctgggggaa aacaaaaagc actttccacc tgtgggtctc acctctccgt
 541 tgtttcttta tttatggga caggcattgg ggtccacttc acttctgcag tgactcacgc
 601 ttcccagaaa atctccgtgg cctcgggtgat gtacacgggtg gtcacccc (SEQ ID NO:35).

OR25

LOCUS AF127838 651 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA6 pseudogene, partial sequence.
ACCESSION AF127838
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..651
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>651
/gene="HLA6"
/pseudo

BASE COUNT 127 a 176 c 139 g 209 t

ORIGIN

1 cttgcctgac atcggtttca ccaccaccac ggtccccgag atgattgtgg acatccaatc
61 tcacagcaga gtcattctct aggcaggccg cctgactcac atgtctctct ttgccattt
121 tggaggcatg gaagagagac atgtcctga gtgtgatggc ctatgacagg ttgttagcca
181 tctgtcaccc tctatatcat tcagccatca tgaacccgtg tttctgtggc tttctagt
241 tctttttt ctctcagtct tttagaggcc cagctgcata acttgattgc ctgcta
301 acctgcttca aggatgtgga aattccta atctctctgt acccttctca actccgccat
361 ctgcatgtt gtgacatctt caccaataac ataatcatgt atttctctgc tgcctgattt
421 ggggttcctc ccatctcggg gacccttcc tctactata aaatgggttc ctccattctg
481 aggcattcat cgtcagggtg gaagtataaa gccttctcca cctgtgggtc tcacgtgca
541 gttgttgcct gagtttatgg aagaggcgtt ggagggtacc tcagttcaga tgtctctct
601 tccccagaa agtttgcatg ggccctcagt atgtacacgg tggtcacccc c (SEQ ID NO:36).

OR26

LOCUS AF127839 644 bp DNA PRI 28-FEB-2000

DEFINITION Hylobates lar HLA7 pseudogene, partial sequence.

ACCESSION AF127839

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 644)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 644)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..644
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>644
/gene="HLA7"
/pseudo

BASE COUNT 130 a 168 c 128 g 218 t

ORIGIN

1 ctgggctgac atcactttca cctcggccat ggttcccaag atgattgtgg acatgcagtc
 61 gcatagcaga gccatctctt atgcaggctg cctgacacag atgtctttct ttgtcctttt
 121 tgcattgatg gaagacatgc tctgactct gatggcctat gaccgatttg tggccatctg
 181 tcacccctg cactaccag tcactgtgaa tctcacctc tgtgtcttct tagttttgtt
 5 241 tctcttttc cttagcctgt tggattccca gctacacagc tggattgtgt ttacaatcca
 301 ccttcttcaa gaatggaaat ctctaattt ttctgtgacc cgtctcaact tctcaacctt
 361 gcctgttctg acagcatcat cgataacata ttatatatt agatagccct atatttggtt
 421 ttcttccat ttcagggatc ctttgtctt agtataaaat tgtctccccc attctgagaa
 481 ttccatgcgc agatgggaag tataaagcct tctccacctg tggctctcac ctggcagttg
 10 541 ttgcatttta tgaacagcgc attggcgtgt acctgacttc agctgtgtca tcaccccca
 601 ggaatggtgt ggtggcgctca gtgatgatg ctgtggtcac cccc (SEQ ID NO:37).

OR27

15 LOCUS AF127840 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA74) gene, partial cds.
 ACCESSION AF127840
 KEYWORDS .
 SOURCE common gibbon.
 20 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 30 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 35 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>649
 /gene="HLA74"
 CDS <1..>649
 40 /gene="HLA74"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDFCYSTTITPKLLENLVVEYRTISFTGCIMQFFLVCIFVGTE
 TFMLAVMAYDRCVAVCNPLLYTVAMSQRLCSLLVATSYSWGIVCFLTLYFLLLELSFR
 45 GNNIINN FVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITVMK
 MPSTGGRKKAFSTCASHLTAITIFHG TILFLYCVPSKSSWLMVKVTSVFYTVFIP" (SEQ ID
 NO:38).
 BASE COUNT 142 a 157 c 129 g 221 t
 ORIGIN
 50 1 ctttgtgat ttctgtatt ctactacgat tacacccaaa ctgctggaga acttggtgtt
 61 ggaatataga actatttctt tcacaggatg catcatgcaa ttcttccttg tctgcatatt
 121 ttagaggaca gaaacattca tgcctggcagt gatggcctat gaccgatgtg tggcgggtgtg
 181 taacctctt ctctacacag ttgcaatgac ccagaggctt tgctcttgt tggtggttac
 241 atcatactct tgggggatag tctgtttctt gacacttacc tactttctac tgggaattac

301 cttcagagga aataatatca ttaataactt tgtctgtgag catgctgcca ttgttgctgt
 361 gtcttgctct gacctctatg tgagccagga gatcacttta gtttctgcca cattcaatga
 421 aataagcagt ctgatgatga ttttcacttc ctatgcttcc attttatca ctgtcatgaa
 481 gatgccttcc actgggggggc gcaagaaagc gttctccacg tgtgcctccc acctgaccgc
 541 cattaccatt ttccatggga ctatcctttt cctctactgt gttcctaact ccaaaagtgc
 601 atggctcatg gtcaaggtga cctctgtctt ttacacagtg ttattccc (SEQ ID NO:39).

OR28

LOCUS AF127841 659 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar HLA75 pseudogene, partial sequence.
 ACCESSION AF127841
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 659)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 659)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..659
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>659
 /gene="HLA75"
 /pseudo
 BASE COUNT 123 a 178 c 143 g 215 t
 ORIGIN
 1 cttgcctgac atcggtttca ccaccaccac ggtcccgag atgattgtgg acatccaatc
 61 tcacagcaga gtcattctct aggcaggccg cctgactcag atgtctctct ttgccatttt
 121 tggaggcatg gaagagagac atgtctctga gtgtgacggc ctatgaccgg ttgttagcta
 181 tctgtcaccc tctatatcat tcagccatca tggaccctgt ttctgtgac ttctagttt
 241 tgttgctttt ttttttct ctcagtcttt tcgactccca gctgcacaac ttgattgcct
 301 tgctaataac ttgcttcaag gatgtggaaa ttctaattt ctctgtgac ctttctcaac
 361 tccccatct tgcattgtgt gacagcatca ccaataacgt catcatgtat ttccctgctg
 421 ccgtatttgg ttctctccc atctcgggga cccttttctc ttgctataaa atcgtttctc
 481 ccattctgag ggtttcatca tcaggtggga ggtataaagc ctttccacc tgtgggtctc
 541 acctgtcagt tgttctgta gtttatggaa gaggtgttgg aggggtacctc agttcagggtg
 601 tgtcatcttc cccagaaaag ggtgcagtgg cctcagtgat gtacacggtg gtcaccccc (SEQ ID NO:40).

OR29

LOCUS AF127842 662 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar HLA8 pseudogene, partial sequence.
 ACCESSION AF127842
 KEYWORDS .

SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

5 REFERENCE 1 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

15 FEATURES Location/Qualifiers
 source 1..662
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>662
 /gene="HLA8"
 /pseudo

20 BASE COUNT 124 a 178 c 143 g 217 t
 ORIGIN
 1 gtcacctgac gtcggttca cctccaccac ggccccgag atgattgtgg acacccattc
 25 61 tcacagcaca gtcattctct aggaggctg cctgactcag atgcctctct ttgccatttt
 121 tggaggcatg gaagagagac aagctcctga gtgtgatggc ctatgaccgg ttgttagcca
 181 tctgtcacc tcatactct tcagccatca tgaatccgtg ttctgtggc tacctagttt
 241 tgtgtcttt tttttttt ttcgactcg ttagactcc cagctgcaca acttgattgc
 301 ctgctaatt acctgcttca gggatgcgga aattcctaatt tcttctgtg accttctca
 361 actccccat ctgcatgtt gtgacacct caccaataac ataatcatgt tattccctg
 421 ctgccatatt tggtttctt cccatctcgg ggaccctttt ctcttctgt aaaattgttt
 481 cctccgttct gagggtttca tcgtcaggta ggaagtataa agccttctcc acctgtgggt
 541 ctacactgtc agttgtttgc tgagtttatg gaagaggcgt tggagggtac gtcagttcag
 601 atgtgtcttc tccccccaga aagggtgcag tggcctcagt gatgtacatg atggtcaccc
 35 661 cc (SEQ ID NO:41).

OR30

LOCUS AF127843 662 bp DNA PRI 28-FEB-2000

40 DEFINITION Gorilla gorilla GGO1 pseudogene, partial sequence.
 ACCESSION AF127843
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

45 REFERENCE 1 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

50 REFERENCE 2 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..662

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>662

/gene="GGO1"

/pseudo

BASE COUNT 127 a 180 c 135 g 220 t

ORIGIN

1 cttgactgac atcggtttca cctccaccac agtccccaag atgattgtgg acatccagtc
61 tcacagcaga gccatctcct atgcacgctg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg ttgtagcca
181 tctgtcaccc tctgtatcgt ccagccatct tgaacccctg ttctgtggc ttctagatt
241 cgtgtgctct gttttttt tttttctc agtcttttag actcccagct gcacaacttg
301 attgccttac aaatgacctg cttcatggat gtggaaatc ctaattctt ctgggaacct
361 tctcaactcc cccatcttgc atgtgtgac acctcacca ggaacatcaa cctgtatttc
421 cctgtgcca tatttggtt tcttccatc tgggggaccc tttctctta ctataaaatt
481 gtttctcca tctgaaggt tcatcaggt gggaagtata aaccttctcc gcctgtggtt
541 ctcacctgac agttgtttac tgattttatg gaacaggcgt tggagggtac ctcggttcag
601 atgtgtcatc ttccccgaga aagggtgcag tggcctcagt gatgtacacg gtggtcaccc
661 cc (SEQ ID NO:42).

OR31

LOCUS AF127844 650 bp DNA PRI 28-FEB-2000

DEFINITION Gorilla gorilla GGO17 pseudogene, partial sequence.

ACCESSION AF127844

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 650)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..650

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>650

/gene="GGO17"

/pseudo

BASE COUNT 129 a 170 c 137 g 214 t

ORIGIN

1 ttttctgac ctctgtttta cctccacgac tgtcccaaag atgttactga atatactgac

61 acagaacaaa ttcataacat atgcaggctg tctcggtcag attttttt ttacttcat
 121 ttggatgctt ggacaattta ctctgactg tgatggccta tgaccgcttc gtggccatct
 181 gtcacccct gcactatacg gtcacatga acccccggt ctgtggactg ctggttctgg
 241 ggtcctggtg catcagtgc atgggttccc tgctcgagac ctgactgtt ttgaggctgt
 301 ccttctgcac caaatggaa attccacact tttttgtga tcttctgaa gtctgaagc
 361 tcgctgttc tgacacctc attaataacg tgggatata ctttgcaact ggcgtcctgg
 421 gtgtgattcc ctactgga atattttct ctactataa aattgtttc tctatactga
 481 ggatttcctc agctgggaga aagcacaagg cgtttccac ctgtggttc cacctctcag
 541 tggtcacctt gttctatggc acgggcttg gggctatct cagtctgca gccacacat
 601 cttctaggac aagtctggtg gcctcagta gtacacat ggtcaccccc (SEQ ID NO:43).

OR32

LOCUS AF127845 649 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla olfactory receptor (GGO18) gene, partial cds.
 ACCESSION AF127845
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>649
 /gene="GGO18"
 CDS <1..>649
 /gene="GGO18"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFVSTTVPKMLVNIQTHNKVITYAGCITQMCFFLLFVGLD
 NFLTVMAYDRFVAICHPLHYMVIMNPQLCGLLVLASWIVGVLSMLQSLMVLPLPFC
 THMEIPHFCEINQVVHLACSDTFNLNDIVMYFAVALLGGGPLNGILYSYSKIVSSIRA
 ISSAQGKYKAFSTCASHLSVVSFLFYGTCLGVYLSSAATHNSHTGAAASVMYTVVTP" (SEQ ID
 NO:44).
 BASE COUNT 136 a 172 c 134 g 207 t
 ORIGIN
 1 ctctgtagac atctgtttt tctctaccac tgtcccgaag atgctggtga acatccagac
 61 acagaacaaa gtcacacct atgcaggctg catcacccag atgtgcttt tctactct
 121 ttaggattg gataacttc ttctgaccgt gatggcctat gaccggttg ttggccatcg
 181 tcacctctg cactacatgg tcattatga cctcaactc tgggactgc tggttctggc
 241 gtctggatc gtgggtgttc tgaattccat gttacaaagc ttaatggtgt tgccactgcc
 301 cttttgaca cacatggaaa tccctcattt ttctgtgaa attaactagg tggccacct

361 tgcctgttct gacaccttc ttaatgacat agtgatgtat ttgcagtag cactgctggg
 421 cgggtggccc ctcaatggga tctgtactc ttactctaag atagtttct ccatacgtgc
 481 aatctcatca gctcagggga agtataaggc atttccacc tgtgcatctc acctctcagt
 541 tgtctcctta tttatggta catgcttagg ggtgtacctt agttctgctg caaccacaa
 5 601 ttcacacaca ggtgctgcag cctcagtgat gtacactgtg gtcaccccc (SEQ ID NO:45).

OR33

LOCUS AF127846 649 bp DNA PRI 28-FEB-2000
 10 DEFINITION Gorilla gorilla olfactory receptor (GGO19) gene, partial cds.
 ACCESSION AF127846
 KEYWORDS .
 SOURCE gorilla.

ORGANISM Gorilla gorilla

15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 20 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>649

/gene="GGO19"

CDS <1..>649

/gene="GGO19"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD

TFLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHVLLMKRLTFS

TGTEIPHFCEPAQVLKVACSNTLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR

40 TSSTKGKYKAFSTCGSHLCVVSFLFYGTGLGVYLSSAVTHSSQSSSMASVMYAMVTP" (SEQ ID

NO:46).

BASE COUNT 118 a 189 c 144 g 198 t

ORIGIN

1 ctttgggac atctgttca tctccaccac agtccccaag atgctagtga acatccaggc

45 61 acggatcaaa gacatctcct acatgggggtg cctcactcag gtgtatttt taatgatgtt

121 tgcctggaatg gatactttcc tactggctgt gatggcctat gaccggtttg tggccatctg

181 ccacccctcg cactacacgg tcacatgaa cccctgcctc tgggctcc tggttctggc

241 atcttgggtc atcattttct ggttctcgt ggttcattgt ctactgatga agagggtgac

301 ctctccaca ggcactgaga ttccgcattt ctctgtgaa ccggtcagg tctcaaggt

50 361 ggctgtctct aacacccctc tcaataacat tgtctgtat gtggccacgg cactgctggg

421 tgtgttctct gtactggga tctcttctc ctactctcag attgtctct ccttaatgag

481 aacgtctctc accaaggga agtacaaagc ctttccacc tgggatctc acctctgtgt

541 ggtctcttg ttctatggaa caggacttgg ggtctatctg agttctgctg tgaccattc

601 ttccagagc agtccatgg cctcagtgat gtacgcatg gtcaccccc (SEQ ID NO:47).

OR34

LOCUS AF127847 649 bp DNA PRI 28-FEB-2000
5 DEFINITION Gorilla gorilla olfactory receptor (GGO2) gene, partial cds.
ACCESSION AF127847

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

15 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Gorilla gorilla"

25 /db_xref="taxon:9593"

gene <1..>649

/gene="GGO2"

CDS <1..>649

30 /gene="GGO2"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICVTSTTVPKTLNIRTSQSKVITYAGCITQMYFFILFVVLD

SLLLTVMAYDRFVAICHPLHYTVIMNSWLCGLLVLSWIVSILCSPLQSIMALQLSFC

35 TELKIPHFFCELNQVVHLACSDTFIKDMMMNFTSVLLGGGCLAGIFYSYFKILCCICS

ISPAQGMNKALSTCASHLSVVSIFYCTGVGVYLSSAATHNSLSNAAASVMTVVTS" (SEQ ID

NO:48).

BASE COUNT 146 a 166 c 129 g 208 t

ORIGIN

1 cttttagac atctgtgta cctccaccac agtcccaaag acactgtcaa acatccggac

40 61 acagagcaaa gtcacacct atgcaggttg catcaccag atgtacttt ttatacttt

121 ttagtggtg gacagcttac tctgaccgt gatggcctat gaccggttg tggccatctg

181 tcacccctg cactacacag tcattatgaa ctctggctc tgggactgc tggttctggt

241 gtctggatc gtgagcatcc tatgttctcc gttacaaagc ataatggcat tgcagctgct

301 ctctgtaca gaattgaaaa tccctcattt ttctgtgaa cttaatcagg tcgtccacct

45 361 tgctgttct gacacttta taaagacat gatgatgaat ttacaagtg tgctgttggg

421 tgggggatgc ctgctggaa tattttactc ttactttaag atactttgt gcatatgttc

481 aatctacca gctcaggga tgaataaagc actttccacc tgtgcatctc acctctcagt

541 tgtctctta tttattgta caggcgtagg tgtgtacct agttctgctg caaccataa

50 601 ctactctca aatgctgcag cctcagtgat gtacaccgtg gtcacctcc (SEQ ID NO:49).

OR35

LOCUS AF127848 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO3) gene, partial cds.

ACCESSION AF127848
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>649
 /gene="GGO3"
 CDS <1..>649
 /gene="GGO3"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDTSFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD
 TFLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHILLMKKL TFS
 TGTEIPHFFCEPAQVLKVACSNLTLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
 TSSTEGKYKAFSTLWISLCVVSLFYGTGLGVYLSSAVTHSSQSSSMASVMYAVVTP" (SEQ ID
 NO:50).
 BASE COUNT 117 a 194 c 143 g 195 t
 ORIGIN

1 ctttgtggac acctcttca tctccaccac agtccccaag atgctagtga acatccaggc
 61 acggatcaaa gacatctct acatgggggtg cctcactcag gtgtatttt taatgatgtt
 121 tgctggaatg gatacttcc tactggccgt gatggcctat gaccggttg tggccatctg
 181 ccacccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
 241 atcttggttc atcattttt ggttctcct ggttcatatt ctactgatga agaagttgac
 301 cttctcaca ggcactgaga ttccgcatft cttctgtgaa cgggctcagg tcctcaaggt
 361 ggcctgctct aacacccctc tcaataacat tgtcttgat gtggccacgg cactgctggg
 421 tgtgttctct gtagctggga tcctcttctc ctactctcag attgtctct ccttaatgag
 481 aacgtctec accgagggca agtacaagc ctttccacg ctgtggatct ccctctgtgt
 541 ggtctccttg ttctatgaa caggactgg ggtctatctg agttctgctg tgaccactc
 601 ttcccagagc agtccatgg cctcagtgt gtacgccgtg gtcaccccc (SEQ ID NO:51).

OR36

LOCUS AF127849 650 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla GGO4 pseudogene, partial sequence.
 ACCESSION AF127849
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
5 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
15 /organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO4"
/pseudo
BASE COUNT 134 a 164 c 132 g 220 t
20 ORIGIN
1 cttggctgag attggttca tctcggtcgc ggttccaag atgacgtgg acatgcagtc
61 acatagcaga gtcactcct atgcgggccg cctgacacag atgtcttct ttgcctttt
121 tgcattgatg gatgacatgc tccggactct gatggcctat gaccgatttg tggccatctg
181 tcacccctg cactaccag tcacatgaa tctcacctc tgtgtctct tagttttgt
25 241 gcctttttc cttagcctgt tggattcca gctgcacagc tggattgtgt tacaattcac
301 ttgcttcaag aatgtggaaa tatctaatt ttatgtgat ccatctcaac ttctaaact
361 tgactgtct gaacagtgc atcaatagca tattcacata ttagatagt actatgttg
421 gtttcttcc cattcaggg atcctttgt ctactataa aattgtccc tccattctaa
481 gaattccatc gtcagatggg aagtataag ccctctccac ctgtggctct cacctgtcag
30 541 ttgttgctt atttatgga ataggcattg gctgtgtac tctacgctg gtcaccac
601 caccaggaa tgggtgtgtg gcatcagtga tctacgcgt gtcaccccc (SEQ ID NO:52).

OR37

35 LOCUS AF127850 650 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO70 pseudogene, partial sequence.
ACCESSION AF127850
KEYWORDS .
SOURCE gorilla.
40 ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650

BASE COUNT 130 a 171 c 136 g 212 t

ORIGIN

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1 tttgctgac ctctgttta cctccacgac tgtcccaaag atgttactga atatactgac
5 61 acagaacaaa ttcataacat atgcaggctg tctcggtcag atttttttt tcaactcatt
121 tggatgcctg gacaatttac tcttgactgt gatggcctat gaccgcttcg tggccatctg
181 tcacccctg cactatacgg tcatcatgaa cccccggctc tgtggactgc tggttctggg
241 gtcttggtgc atcagtgtca tgggttcct gctcgagacc ttgactgttt tgaggctgct
301 cttctgcacc aaaatggaaa ttccacactt ttttctgat cttctgaag tctgaagct
10 361 cgctgttct gacacctca ttaataacgt ggtgatatac ttgcaactg gcgtcctggg
421 tgtgattccc ttactggaa tattttctc ttactataaa attgtttct ctatactgag
481 gatttccca gctgggagaa agcaciaaagc gtttccacc tgtggtccc acctctcagt
541 ggtcaccttg tctatggca cgggctttgg ggtctatctc agttctgcag ccacaccatc
601 ttctaggaca agtctggcgg cctcagtgtg gtacacatg gtcaccccc (SEQ ID NO:55).
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OR39

LOCUS AF127852 649 bp DNA PRI 28-FEB-2000

DEFINITION Eulemur fulvus olfactory receptor (EFU35) gene, partial cds.

ACCESSION AF127852

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemnridae; Eulemur.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>649

/gene="EFU35"

CDS <1..>649

/gene="EFU35"

/codon_start=2

/product="olfactory receptor"

/translation="LTDICLSTATVPKMLANIRTRSQSITYAACLTQMCFVLGSATLE

NFLLAVMAYDRYVAICHPLRYAVIMNLRLCGFLILLSISIMDTLLHDLMLVRLSFC

THLEIPLFFCEVVQVIKLACSDTLINLLIYFAAGVLGGVPLSGIIFSQTQIASSVLR

MASASGKYKAFSTCGSHLSVVSLLYGTGLGVYISSAFMHSPTMAVASMMYTVVTP" (SEQ
ID NO:56).

BASE COUNT 123 a 176 c 148 g 202 t

ORIGIN

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1 cctcactgac atctgtttaa gcacagccac cgtcccaaag atgctggcaa acatccgaac
61 acggagtcag agcatcacgt atgcagcctg cctcaccag atgtgcttgg ttctgggttc
121 tgctacgttg gaaaatttct tctggcagt aatggcttat gaccgctatg tggccatctg
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181 tcatacctctg agatacgcgg tcatacatgaa ccttcgtctc tgtggcttct tgatccttt
 241 gtcctctgtct attagcatca tggacaccct gctccacgat ctgatggctc tgcggctgtc
 301 cttctgcaca cacctggaga taccctctt cttctgcgag gttgtgcaag tcataagct
 361 tgccctgttct gataccctca tcaataacct ctgatatat ttgcagctg gcgtgttggg
 421 aggtgttct ctgtctggga tcaatttctc ttatactcag attgcctcct ctgttttgag
 481 aatggcatca gcaagtggaa agtataaagc ttttccacc tgggctctc acctctcggt
 541 tgtgtccttg ctctacggga caggttggg ggtgtacatc agttctgcgt ttatgcactc
 601 tcccaggacg atggcagtgg cttaatgat gtacacggtg gtcactccc (SEQ ID NO:57).

OR40

LOCUS AF127853 645 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus EFU36 pseudogene, partial sequence.
 ACCESSION AF127853
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 645)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 645)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..645
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>645
 /gene="EFU36"
 /pseudo
 BASE COUNT 118 a 189 c 138 g 200 t
 ORIGIN

1 ctttctgac gtctgttca cctccaccac ggtgccaag atgttagtga acatccaggc
 61 gcacagcaag gccatcacat acaaaggctg cctcaccag atgtgtttt tcttgatttt
 121 tgggtggcta gtttctact gacggtgatg gcctatgacc ggttcgtggc catctgtcac
 181 cccctgcgct acatggatcat catgaacccc aggctctgtg gtcttctgct tctcctttct
 241 tggttgatct gcttgacgta ttctctgtg caaagtctga tggttttgag ggtgtccttc
 301 tgccaagaaa tagaatccc ccactacttc tgtgaacttg ctcagatcct cacgctcgcc
 361 tgctctgaca ccctagttaa tgacgtctcg ctgtatttc tatctgctct gctcgggtgt
 421 attcccctga ctgggatcct ttattcttat tccagaatta tctctccat aatgtgcatt
 481 tcctctgctg gagggaaagta caaagccttt tcacactgtg ggtctcacct ctccgtcgtc
 541 tcctgttct acggatcagg ccttggggtc tacctaactt ctgaacagc ccagccctcc
 601 agaaggggtt caatagcctc ggtgatgtac accatgttca ccccc (SEQ ID NO:58).

OR41

LOCUS AF127854 647 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus EFU37 pseudogene, partial sequence.

ACCESSION AF127854
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 5 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 647)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 10 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 647)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 15 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..647
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 20 gene <1..>647
 /gene="EFU37"
 /pseudo
 BASE COUNT 118 a 192 c 141 g 196 t
 25 ORIGIN
 1 cttgttgac atctgttca cctccaccac catecccaag atgactgtgg acatcctaac
 61 tcacagcaga gtcactcct ctgggggctg tctgaccag atgtctcttg ctctgctttt
 121 tgtttgtgtg gatgatatgc ttctgaccgt gtcggcctgt gacctgttg tggccatctg
 181 ccacccctg cactacacgg tcatcatgaa cccccacttc tgtggcctcc tggttctgat
 241 atcttggttc atcatgtccc tgggtgtcct ggttcacctc ctactgataa ggaggctgac
 301 attccccagg gccacagaaa tcccacatta ctctgtgaa ctggctcaaa ttctcaaagt
 361 ggcccaactct gacagcttca tcaataacat ctctgtgtac ttgtcggctg tgttgctggg
 421 tgtgtttccc atcacaggga tctctactc ctactctaaa attgtctcct ccgtaatgag
 481 gatgtctgcc actgcaggca agaagaaagc attttccacc tgtgggtctc atttgtgtgg
 35 541 tctgctgtt ctatggaaca gggttgggg tctacctcag ctctgtgtg accccttctt
 601 cccagagcag cagcattgcc tcagtgtgt actcgtgtgt caccccc (SEQ ID NO:59).

OR42

40 LOCUS AF127855 652 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer ERU38 pseudogene, partial sequence.
 ACCESSION AF127855
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 45 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 50 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..652
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>652
/gene="ERU38"
/pseudo

BASE COUNT 124 a 191 c 136 g 201 t

ORIGIN

1 cttgttgac atctgttca cctccaccac catccccaag atgctggtga acattgacac
61 acacagcaaa gacatctct acgtgggatg cctcactcag atgtatttt tcatggtgtt
121 tgggtggactg gacaacttcc tctgaccgt gatggcctgt gaccggttg tggccatctg
181 tcacccctg cactatgcag tacagtcatc atgaaccccc gcttctgtgc cctcctggtt
241 ctgatgtctt ggttcatcat gtcctggat gccctggtc atgttctact tatactgagg
301 ctgacctttt ccttagaaac tgaatccca catttctct gtgacctggc tcagatgctc
361 gaggtggccc gctctgacac ctttatcaat aacatctgct tgtactgtt ggctgtgttg
421 ctgtatgttt cctgtcacgg ggatcctcta cccctactct aaaattgtct cctccttaat
481 gaggatgtcc tccactgcag gcaagaagaa agcattttcc acctgtgggt ctcacctctc
541 tgtggtctc ttgtctatg gaacaggact tggggtctac ctaagttctg ctgtgacccc
601 ttcttccag agcagcgcca ttgcctcagt gatgtacaca gtagtcaccc cc (SEQ ID NO:60).

OR43

LOCUS AF127856 648 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU39 pseudogene, partial sequence.
ACCESSION AF127856

KEYWORDS

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>648
/gene="ERU39"
/pseudo

BASE COUNT 132 a 173 c 141 g 202 t

ORIGIN

1 ctttgcagac atctgttttg tgtccaccac tgtccagag atgctgaatg tgcagacatg

61 gagcaaagtc atatectaca caggctgcat caccagatg gacttttct tgctcttgt
 121 aggactggac aacttctcc tgaccgtgat ggcctgtgac cggtttgtgg ccatctgtca
 181 cccctgcac tatgcagtag agtcatcatg aacccaggc tctgtgcatt tctgttctg
 241 gtgttctgga tctctagtg cctgaattcc ttgtacaaa gcttaatggt gttgcagata
 301 accttctgta cagacttggg aatccccac ttttctgtg aactaatca gataatccac
 361 cttgcctgtt tggacacctt tctaatgac atggtgatgt attggcagt gatgctgctg
 421 ggtggggggg gccttactgg gatcctttac tcttactcta agatagtffc ctccgtacgt
 481 gcaatctcct cggctcaggg gaagtataaa gcattttcca cctgtgcatc tcacctctcg
 541 gtcgtctcct tattttattg tacatgccta ggggtgtacc tcagtctgc tacacacaac
 601 tcacactcca gcgcaacagc ctcggtgatg tacacggtgg tcactccc (SEQ ID NO:61).

OR44

LOCUS AF127857 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU40) gene, partial cds.
 ACCESSION AF127857
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>649
 /gene="ERU40"
 CDS <1..>649
 /gene="ERU40"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LSDICFTSTTIPKMLVNLHAHSDKDISYRECLTQVYFFMIFAGLD
 NFLLTVMAYDRFVAICHPLHYMVIMNPRFCALLVLMSWFIMSLVALVHVLLILRLTFS
 LETEIPHFSC EVAQILKVARSDTFNNICLYLSAVLLGVFPVMGILFSYSKIVSSLMR
 MSSTSAKNKAFSTCGSHLCVVSLFYGTALGVYLLSAVTPSSQSSAIASVMYTVVTP" (SEQ ID
 NO:62).
 BASE COUNT 119 a 187 c 131 g 212 t
 ORIGIN
 1 ctttctgac atctgttca cctctaccac catcccaaag atgctggtga acctcacgc
 61 acacagcaaa gacatctcct acagggagtg cctcactcag gtgtatttt ttatgattt
 121 tgctggactg gataatttcc tctgaccgt gatggcctat gaccggttg tggccatctg
 181 ccacccctg cactacatgg tcatcatgaa tccccgcttc tggccctcc tggttctcat
 241 gtcttgcttc atcatgtctc tggttgccct ggttcattgt ctactatat tgaggctgac
 301 ttttctcta gaaactgaaa tcccacatt ctcctgtgag gtggtcaga ttctcaaggt

361 ggccccgtctt gacaccttct tcaataacat ctgcttatac ttgtcggctg tgggtctggg
 421 tgtgtttccc gtcattggga tctcttcttc ctactctaaa attgtttcat ccttaatgag
 481 gatgtcctcc acttcagcaa agaataaagc atttccacc tgggggtctc acctctgtgt
 541 ggtctctttg ttctatggaa ctgcacttgg ggtctacctc agctctgctg tgacccttc
 601 ttccagagc agcgccattg cctcagtgtg gtacacgggtg gtcaccccc (SEQ ID NO:63).

OR45

LOCUS AF127858 648 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus EFU56 pseudogene, partial sequence.
 ACCESSION AF127858
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
 REFERENCE 1 (bases 1 to 648)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 648)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..648
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>648
 /gene="EFU56"
 /pseudo
 BASE COUNT 131 a 180 c 142 g 195 t
 ORIGIN
 1 cttttagac atctatattg ttctaccac ggtcccaaag atgctgggtg atatcaagac
 61 acacagcaaa gccatattct acgcaggctg tgcaccag atgcacttt gcataacgtt
 121 tgcagagtag gcatcttct cctgactgtg atggcctatg actggttgg ggccatctgt
 181 caccctctgc actatgtgt catcatgaac cccaggctct gtgcactgct tgttctgtg
 241 tcttgatca tgagtgtct gaattcctt ttgcaaagct taatggtgt gccactgccc
 301 ttctgtgag agttggaaat ccccgattt ttctgtgac ttaacagat aatcctcct
 361 gcctgttctg acacctttct taatgacgtg gtgatgtatt tggcagctat gctactgggt
 421 gaggggtgcc ttactgggat ccttactct tactctaaga tagtttctc cgtacgtgca
 481 atctcctcgg ctcaggggaa gtataaagca tttccacct gtgcactca cctctcgtc
 541 gtctccttat ttactgcac aagcctcggg gtgtacctg gctctgctgc tacacacaac
 601 tcacactcca gcgcaacagc ctcggtgatg tacacgggtg tactccc (SEQ ID NO:64).

OR46

LOCUS AF127859 643 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU57) gene, partial cds.
 ACCESSION AF127859
 KEYWORDS .
 SOURCE Eulemur fulvus.

ORGANISM *Eulemur fulvus*
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; *Eulemur*.

REFERENCE 1 (bases 1 to 643)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 643)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 15 source 1..643
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>643
 /gene="EFU57"
 20 CDS <1..>643
 /gene="EFU57"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADICFVSTTVPEMLNVQTWSKVISYTGCTQMDFFLLFVGLDN
 25 FLLTVMAYDRFVAICHPLRYAVIMNPRLCVFLVLVSWILSVLNSLSQSLMVLRLTFCT
 DLEIPHFFCELNQIIHLACSDTFLNDVVMYLAVMLLGGGCLTGILYSYSKIVSSVRAI
 SSAQ GKCKAFSTCASHLLVVS LFYCTCLGVYLSSATHNSHSSATASVMYTVVTP" (SEQ ID
 NO:65).
 BASE COUNT 127 a 171 c 143 g 202 t
 30 ORIGIN
 1 cttgcagac atctgttttg tgtccaccac tgtcccagag atgctgaatg tgcagacatg
 61 gagcaaagtc atatcttaca caggctgcat caccagatg gacttttct tgctctttgt
 121 aggactggac aacttctcc tgaccgtgat ggcctatgac cggtttgtgg ccatctgtca
 181 cccctgcgc tatgcagtc tcatgaacc caggctctgt gtatttctg ttctggtgac
 35 241 ctggtactcg agtgctctga attcctgtgc aaaaagctta atggtgttgc ggctaactt
 301 ctgtacagac ttggaaatcc cccactttt ctgtgaactt aatcagataa tccacttgc
 361 ctgttcggac acctttctta atgacgttgt gatgtatttg gcagtgatgc tgctgggtgg
 421 gggatgcctt actgggatcc ttactctta ctctaagata gtttctccg tacgtgcaat
 481 ctctcggct caggggaagt gtaaagcatt ttccactgt gcattcacc tcttggtcgt
 40 541 ctcttattt tattgtacat gcctaggggt gtacttgagt tctgtacac acaactcaca
 601 ctccagcgca acagcctcgg tgatgtacac ggtggtcact ccc (SEQ ID NO:66).

OR47

45 LOCUS AF127860 644 bp DNA PRI 28-FEB-2000
 DEFINITION *Eulemur rubriventer* ERU66 pseudogene, partial sequence.
 ACCESSION AF127860
 KEYWORDS .
 SOURCE *Eulemur rubriventer*.
 50 ORGANISM *Eulemur rubriventer*
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; *Eulemur*.
 REFERENCE 1 (bases 1 to 644)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 644)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..644
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>644
 /gene="ERU66"
 15 /pseudo
 BASE COUNT 113 a 191 c 145 g 195 t
 ORIGIN
 1 cttttctgac atctgtttca cttccgccac catcccaaag atgctgtgga gcatccgggc
 61 acagagcaaa tccatcaccc gtgccggctg cctcacacag atgtactgtt tcatggcttt
 20 121 tggactctg gacaatctga tgctgatgt catggcttat gaccactttg tggccatctg
 181 tcacctctg cactacacag tcatcatgaa cccagtgtc tgtgtccagg tgcttgcga
 241 caccgggctt gtcagcatcc tgggggcctt cctcggagag tgaccgtgtt gcggcttctt
 301 ttggtgcagt cactgaaatc ccacactatt tctgtgagct cctgaggct ctccagctct
 361 cccactctga cccctccatc aataatgtca tattatacat tgtgacgggt tcatgggctt
 25 421 ctttctctt gctgagattc ttttctcta ttctccaact gtttttctg tcttgaggat
 481 ctcaacagca ggggggaagt ataaagtgtt ttctctctgt gagtctcacc tctcggtgt
 541 ctgcctgttc tgtgggacct gcctggggtc tagctcagtt ccacatggac acacgttct
 601 ccgacagggg tgttgctctg gtcccatata ctgtagtcac cccc (SEQ ID NO:67).

OR48

LOCUS AF127861 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU67) gene, partial cds.
 ACCESSION AF127861
 35 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 40 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 45 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 50 FEATURES Location/Qualifiers
 source 1..649
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>649


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/ gene="ERU67"
CDS      <1..>649
/ gene="ERU67"
/ codon_start=2
5         / product="olfactory receptor"
/ translation="FMDICFTTVIVPKMLVNFLSETKAISYVGCLVQMYFFMALANTD
SYLLASMAIDRLVAICKPFHYDVVMSPRRCLLMLLGSTISHLHSLFRVLLMSRLSFC
ASHIIKHFFCDTQPVLKLSGSDTSSSQIVVMTETLAVIVTPFLCIIFSYLRIITVLA
IPSAAGKWKAFTSCGSHLTVVVLFYGSVIYVYFRPLSMYSVMKDRVATVMYTVVTP" (SEQ
10 ID NO:68).
BASE COUNT    119 a   200 c   141 g   189 t
ORIGIN
    1 ttcatggat atctgctca caacagtcac tgtgccaag atgctggtga atttctgtc
    61 agagacaaag gccatctct atgtgggctg tctgtccag atgtacttct tcattggccct
15   121 tgcaaacact gacagctacc tactggcctc catggctatt gaccggctgg tggccatctg
    181 caaacccctc cactatgatg tggttatgag cccacggcgt tgccctctca tctgttggg
    241 ttctgcacc atctccacc tacactccct gtccgggtg ctactcatgt ctgcctgtc
    301 ttctgtgcc tccacatca ttaagcactt ttctgtgat acccagcctg tgctaaagct
    361 ttctgtctc gacacatct ccagccagat tgtggtcatg accgagaccc tggctgtcat
20   421 cgtgaccccc ttctgtgca tcattcttc ctatctgaga atcatcatca ctgtgctcgc
    481 aatccctctc gcagccggga agtgaaggc cttctccacc tgtggtccc acctcactgt
    541 ggtgtcctg ttctatggca gtgtcatcta tgtgtatttc aggccctgt ccatgtactc
    601 agtgatgaag gaccgggtag ccacagtat gtacacgta gtgacacct (SEQ ID NO:69).

25 OR49

LOCUS   AF127862   649 bp   DNA           PRI    28-FEB-2000
DEFINITION   Eulemur fulvus olfactory receptor (EFU83) gene, partial cds.
ACCESSION   AF127862
30  KEYWORDS   .
SOURCE      Eulemur fulvus.
ORGANISM    Eulemur fulvus
            Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
            Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
35  REFERENCE   1 (bases 1 to 649)
AUTHORS     Giorgi,D.G. and Rouquier,S.P.
TITLE       The olfactory gene repertoire in primates and mouse: evidence for
            reduction of function in primates
JOURNAL      Unpublished
40  REFERENCE   2 (bases 1 to 649)
AUTHORS     Giorgi,D.G. and Rouquier,S.P.
TITLE       Direct Submission
JOURNAL      Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
            Montpellier Cedex 5 34396, France
45  FEATURES     Location/Qualifiers
            source          1..649
                        /organism="Eulemur fulvus"
                        /db_xref="taxon:13515"
            gene           <1..>649
50          /gene="EFU83"
CDS         <1..>649
            /gene="EFU83"
            /codon_start=2
            /product="olfactory receptor"

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/translation="FSDICLVSTTVPQMLVNVQTHSKVISYAGCVTQMDFFVLVFGLD
SFLTVMAYDRFVVICHPLHYAVTMNPRLCGLLVLLSWIMSALSSLLESVLVWVCFC
LDLEIPHFCELENEIHLACSDTFLIDMVMYFSALLGGGSLAGILYSYSKIVSSVRA
ISSAQGKYKAFSTCASHLAVVSLFYCTSLGVYLSSAATHNSHSSATASVMYTVVTP" (SEQ ID

NO:70).

BASE COUNT 119 a 182 c 152 g 196 t

ORIGIN

1 cttttctgac atctgcttgg tctcgaccac tgtccacag atgctggtga atgtgcagac
61 acacagcaaa gtcatactct acgcaggctg cgtcaccag atggacttct ttgtactctt
121 tgtagggtcg gacagcttcc tcttaccgt gatggcctat gaccggtttg tggctacttg
181 ccaccactcg cactacgcgg tcaccatgaa cccaggtc tggggctgc tgggtctgct
241 gtcttgatc atgagtgccc tgagttcct gtagaaagc ttagtggtgc tggggctg
301 ctctgtctg gacttggaat tccccactt ttctgtgaa cttatgaga taatccact
361 ggctgttct gacacttct ttattgacat ggtgatgat ttctcagctc tactgtggtg
421 tgggtgttcc ctggctggga tctttactc ttactctaag atagtttct cgtgtactgc
481 aatctctca gctcagggga agtataaagc atttccacc tgtgcatctc acctgcggtg
541 tgtctccta ttctactgca caagctcgg ggtgtacttg agttctgtg ctacacaaa
601 ctacactcc agcgcaacag cctcgggtgat gtacacggtg gtcactccc (SEQ ID NO:71).

OR50

LOCUS AF127863 642 bp DNA PRI 28-FEB-2000

DEFINITION Eulemur rubriventer EFU84 pseudogene, partial sequence.

ACCESSION AF127863

KEYWORDS .

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..642

/organism="Eulemur rubriventer"

/db_xref="taxon:34829"

gene <1..>642

/gene="EFU84"

/pseudo

BASE COUNT 130 a 180 c 138 g 194 t

ORIGIN

1 cttttagac atctgttttg tcttaccat ggtcccaaag atgctggtga acatcaagac
61 acacagcagt catatctctat gcaggctgtg tcaccagat gcacttttcc ataactttg
121 cagagtaga catcttctc ctgacggtga tggcctatga ccggtgtgtg gccatctgtc
181 acccctgca ctacacggcc atcatgaacc ccaggctctg tgaactgtg gttctgctt
241 cctggatcat aagtggccc aattcctgt taaaaagtgt aaagggtgtg tggctgtcct
301 tctgtacaaa ctggaaatc cgtcactttt tctgtgaact tagatactac atcttgctctg

361 ttgtgacacc tctgttcacg acgtggtgat acatattgca gctgtggtgc tggctgttt
 421 tctcttgcg gggatccttt actcttactc tcagatagtt tctccacac gtgcactctc
 481 ctcagctcag gcgaagtga aagcatttc cacctgtgca gctcacctcg cgggtgtctc
 541 tctatttac tgcacaagcc tcgggggtga cttgagctct gctgtctacac acaaccaca
 601 ctccagcgca acagcctcgg tgatgtacat ggtggtcact cc (SEQ ID NO:72).

OR51

LOCUS AF127864 652 bp DNA PRI 28-FEB-2000
 10 DEFINITION Eulemur fulvus EFU86 pseudogene, partial sequence.
 ACCESSION AF127864
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 20 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..652
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 30 gene <1..>652
 /gene="EFU86"
 /pseudo
 BASE COUNT 126 a 166 c 152 g 208 t
 35 ORIGIN
 1 ctttcagac atctgtttg gttccaccac tgtcccaaag atgctggtga atgtgcagac
 61 acagagcaaa gtcatactct acgcaggctg cgtcaccag atggactttt tcatactct
 121 tgcagggttg gatacttta tgctgatcat gatggcctat gaccggttg gggccatctg
 181 tcaccactg cagtacacgg tcatcatgaa cccaggctc tgtgggctgc tggttgtggt
 40 241 gcctggatc ttgagtacc tgaattcctt gttacaaagc ttaatggtgt tgcactgtc
 301 cttttgata cacttggaag tctcacttt ttctgtgaac ttaatcaggt tgtccacctt
 361 gcctgttctg aaaccttctt taatgacatg gtgatgtatc tgatatctgt ggtgctgggt
 421 ggtggttccc tggctgggac tctttattct ttcttactgc agaatagttt gctccatacg
 481 tgcaacgtcc tcagctcagg ggaagtataa agcatttccc acctgtgcat ctacactctc
 45 541 agttgtctcc ttatcttct gcacaatctc aggggtgtac ctcagctctg ctgctaccca
 601 gaattcgtgc tccagtgcag tagccttggt ggtgtacacg gtggtcactc cc (SEQ ID NO:73).

OR52

50 LOCUS AF127865 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU87) gene, partial cds.
 ACCESSION AF127865
 KEYWORDS .
 SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 649)

5 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

10 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

15 source 1..649

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>649

/gene="EFU87"

20 CDS <1..>649

/gene="EFU87"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFTSTTIPKMLVNIETHSKDISYMGCLTQMYFFMIFAGLD

25 NFLLLTVMAYDRFVAICHPLHYTVIMSPRFCALLVLISWFIMTLVALVHVLLILRLTFS

LETEIPHFCDLAQILEVAHSDTLINNICYMLSTVLLGVFPVTGILFSYSKIVSSLMR

MSSTAGKKKAFSTCGSHLSVVCLFCGTGVGVYLSSAVTPSSQSSSIASVMFTVVTP" (SEQ ID

NO:74).

BASE COUNT 125 a 187 c 134 g 203 t

30 ORIGIN

1 cttgttgac atctgtttca cctccaccac catccccaag atgctggtga acattgaaac

61 acacagcaaa gacatctct acatgggatg cctcactcag atgtatttt tcatgattt

121 tgctggactg gataatttcc tctgactgt gatgcctat gaccggttg tggccatctg

181 ccaccctta cactacacgg tcatcatgag tccccgcttc tgtgccctcc tggttctcat

35 241 atcttggttc atcatgacct tggttgccct ggttcattga ctactgatat tgaggctgac

301 cttctcttta gaaactgaaa tcccacattt ctctctgtgac ctggctcaga ttctcgaggt

361 ggcccactct gataccctca tcaataacat ctgcatgtac ttgtcgactg tgttctgtgg

421 cgtgttttct gtcacgggga tcctcttctc ctactctaaa attgtctct ccttaatgag

481 gatgtcctcc actgcaggca agaagaaagc atttccacc tgtgggtctc acctctctgt

40 541 ggtctgcttg ttctgcggaa caggagtgg ggtctatctc agttctgctg tgacccttc

601 ttccagagc agcagcattg cctcagtgat gttcacggtg gtcaccccc (SEQ ID NO:75).

OR53

45 LOCUS AF127866 646 bp DNA PRI 28-FEB-2000

DEFINITION Macaca sylvanus MSY1 pseudogene, partial sequence.

ACCESSION AF127866

KEYWORDS .

SOURCE Barbary ape.

50 ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

REFERENCE 1 (bases 1 to 646)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 5 REFERENCE 2 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..646
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>646
 15 /gene="MSY1"
 /pseudo
 BASE COUNT 115 a 186 c 144 g 201 t
 ORIGIN

1 cttgttgac atctgttta tctccaccac cgtccccagg atgctgatga acatccaggc
 20 61 atggagcaaa gacatctcct acgtgggggtg cctcactcag gtgtattttt taatgatgtt
 121 tgttggaatg gatactttcc tactggccat gatggcctat gaccggtttg tggccatctg
 181 ccacccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
 241 atcttgattc atcattttat gggctcctct agttcatait ctactgatga agagtttgat
 301 ctccataggc actgagattc cgcaattctt ctgtgaactg gctcagggcc tcaagggtggc
 25 361 ccgtctgat actctcctcg ttaacattgt ctgtatgtg gccacagcac tgctgggtgt
 421 gcttcctgta gctgggagcc tcttcctcta ctctcagatc gtctcctect taatgaggat
 481 gtctccacc gagggcaagt gcaaagcctt tccacctgt gggctcacc tctgtgtggt
 541 ctccttggtc tatggaacag gacttgggtt ctatctcagt tctgctgtga cccattctc
 601 ccagagcagc tccatggcct cagtgtatga cccatggtc accccc (SEQ ID NO:76).

OR54

LOCUS AF127867 649 bp DNA PRI 28-FEB-2000
 DEFINITION Macaca sylvanus olfactory receptor (MSY12) gene, partial cds.
 35 ACCESSION AF127867
 KEYWORDS .
 SOURCE Barbary ape.
 ORGANISM Macaca sylvanus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 40 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 45 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 50 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Macaca sylvanus"

/db_xref="taxon:9546"
 gene <1..>649
 /gene="MSY12"
 CDS <1..>649
 /gene="MSY12"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDVCFVSTTVPKMLVNIQTQNKVITYAGCISQMCFFIFFAGLD
 IFMLTVMAYDRFVAICHPLHYVTMTNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
 ADLEIPHFCELNQVIHLTCSDTFLNDMVMYLSAVLLGGGCLIGILYSYSKIVSSIHA
 ISSVQGKYKAFSTCASHLSVVSIFYCTILGVYLSSAATHSSHASAAVSVMYTVVTP" (SEQ ID

NO:77).

BASE COUNT 132 a 173 c 138 g 206 t

ORIGIN

1 cttcgtagac gtctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
 61 acagaacaaa gtcacacact atgcaggctg catcagccag atgtgctttt tcataattct
 121 tgcaggattg gacactctta tctgaccgt gatggcctac gacaggtttg tggccatctg
 181 tcacccccctg cactacacgg tcacatgaa ccccaggctc tgtggactgc tggttctggc
 241 gtctgtgac atgagtggcc tgaattcttc attgcaaagc ttaatggat tgcaccttcc
 301 cttctgtgca gacttggaat tccccactt ttctgtgaa ctaatacagg tcacccacct
 361 tacctgttct gacacttttc ttaatgacat ggtgatgtat ttgtcagctg tgctgctggg
 421 tgggggatgt ctcattggga tcctttactc ttactctaag atcgtctcct ctatacatgc
 481 aatctcatca gttcagggga agtacaaggc atttccacc tgtgcatctc acctctcggt
 541 tgtctcctta ttatttgta caatctagg tgtgtacctt agttctgctg caaccacag
 601 ctacacgca agtgctgcag tctcggtgat gtacactgtg gttaccccc (SEQ ID NO:78).

OR55

LOCUS AF127868 649 bp DNA PRI 28-FEB-2000
 DEFINITION *Macaca sylvanus* olfactory receptor (MSY16) gene, partial cds.
 ACCESSION AF127868
 KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>649

/gene="MSY16"

CDS <1..>649

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/gene="MSY16"  
/codon_start=2  
/product="olfactory receptor"  
/translation="LADIGFTSTTPVKMLVNIQAQSN AISYAGCISQMYFFMVFGGID  
TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLSWFLSLSYSLIQSLLMLQLSFC  
TSWVIQHFYCELAQALTLACSDTHINYILLYVVTGLLGFVPFSGILFSYQTQIVSSILR  
ISSTDGKHKAFSNCGSHLSVVFLFYGTGLGVYLLSSNASSSSWRGMVASVMYTVVTP" (SEQ ID
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NO:79).

ORIGIN

1 cttgctgac atcggttfca cctccaccac agtccccaag atgctgggtga acatccaggc
61 gcagagcaat gccatcagct atgcaggctg catctcccag atgtattttt tcatgtttt
121 tggaggcata gacacatttc tctcaccgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg tactaccctg tcattatgaa cccccgcctc tctggcctgc tggttcttgt
241 gtctctgttc ctacgtctgt catactccct gatccagagt ctgttgatgc tgcagttgtc
301 cttttgcacc agttgggtca ttacgacctt ttactgcgag ctgtctcagg ccttcacgct
361 tgctgtctca gacacacaca tcaattacat cctgctctac gtgggtgaccg gccctctggg
421 ttttgtgcc ttctcaggaa tctttttc ctacacccaa atgtctctt ccatctcgt
481 aatctcatcc acagatggga aacacaaagc ctcttctaac tgcggatctc atctgtctgt
541 ggttttttta ttctatggga caggctcttg tgtgtatctt agttccaatg catcgtctc
601 ttttgcccg ggcatgtgtg cctcggctat gtacactgtg gtcaccccc (SEQ ID NO:80).

OR56

LOCUS AF127869 647 bp DNA PRI 28-FEB-2000

DEFINITION *Macaca sylvanus* MSY2 pseudogene, partial sequence.

ACCESSION AF127869

KEYWORDS

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 647)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 647)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES	Location/Qualifiers
----------	---------------------

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source      1..647
            /organism="Macaca sylvanus"
            /db_xref="taxon:9546"
gene        <1..>647
            /gene="MSY2"
            /pseudo
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BASE COUNT 131 a 173 c 137 g 206 t

ORIGIN

1 cttegtagac gtctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
61 acagaacaaa gtcacacct atgcaggctg catcagccag atgtgctttt tcatattctt

121 tgcaggattg gacaccttta tgctgaccgt gatggcctac gacaggtttg tggccatctg
 181 tcacctctg cactacacgg tcaccatgaa ccccaggctc tgggactgc tggttctggc
 241 gtcctgatca tgagtgcctt gaattcttca ttgcaaagct taatggtatt gcacattcc
 301 ttctgtgcag acttggaat tccccacttt ttctgtgaac ttaatcagggt catccacct
 361 acctgttctg acacttttct taatgacatg gtgatgtatt tgcagctgt gctgctgggt
 421 gggggatgtc tcattgggat cctttactct tactctaaga tcgtctctc tatacttga
 481 atctcatcag ttcaggggaa gtacaaggca tttccacct gtgcattca cctctcggt
 541 gtctcttat ttattgtaca atcctagggt gtaccttag ttctgtgca acccacagct
 601 cacacgaag tgctgcagtc tcggatgatg acactgtgtg taccctc (SEQ ID NO:81).

OR57

LOCUS AF127870 649 bp DNA PRI 28-FEB-2000
 DEFINITION *Macaca sylvanus* olfactory receptor (MSY4) gene, partial cds.
 ACCESSION AF127870
 KEYWORDS .
 SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>649
 /gene="MSY4"
 CDS <1..>649
 /gene="MSY4"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FIDICFVSTTVPKMMVNIQTQSRVITYAGCITQMCFFIFFVGLD
 IFMLTVMAFDRFVAICHPLHYTVTMNPRLSGLLVLASWIMSALNSSLQSLIVLRLSFC
 TDLEIPHFFCELNQVVHLACSDTFLNDMVMYLASALLGCGPLSGILYSYSKIVSSIRG
 ISSAQGKYRAFSTCASHLSVVSFLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID
 NO:82).

BASE COUNT 125 a 179 c 142 g 203 t
 ORIGIN

1 cttcatagac atctgttttg tgtccaccac tgtcccgaag atgatggtga acatccagac
 61 acagagcaga gtcacacct atgcaggctg catcaccag atgtgctttt tcatattct
 121 ttggtggactg gatatcttta tgctgaccgt gatggccttt gaccggttg tggccatctg
 181 tcacccctg cactacacgg tcaccatgaa ccccaggctc agtgggctgc tggttctggc
 241 gtcctggatc atgagtcccc tgaattctc gttacaaagc ttaatagtc tgcggtttc
 301 cttctgcaca gacttggaat tccccactt ttctgtgaa cttaatcagg tggccacct

361 tgcctgttct gacaccttc ttaatgacat ggtgatgtat ttggcatctg cactgctggg
 421 ctgtggctccc ctctctggga tctttattc ttattctaag atcgttcct ccatacgtgg
 481 aatctcatca gctcagggga agtacagggc atttccacc tgtgcatctc acctctcagt
 541 tgtctcctta tttatgta cgctcctagg agtgtacttt agttctgctg caacccgtaa
 5 601 ctcacactca agtgctgcag cctcgggtgat gtacaccgtg gttaccccc (SEQ ID NO:83).

OR58

LOCUS AF127871 646 bp DNA PRI 28-FEB-2000
 10 DEFINITION Macaca sylvanus olfactory receptor (MSY6) gene, partial cds.
 ACCESSION AF127871
 KEYWORDS .
 SOURCE Barbary ape.
 ORGANISM Macaca sylvanus
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..646
 30 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>646
 /gene="MSY6"
 CDS <1..>646
 35 /gene="MSY6"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDLFFVTNTIPKMLVNLQSQNKAI SYAGCLTQLYFLVSLVALD
 NLILAVMAYDRYVAICCPHYTTAMSPKLCILLLSLCWVLSVLYGLIHTFLMTTVTFC
 40 GSRKIH YIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIISYVLIVRAILR
 IPSVSKKYKAFSTCASHLGVSFLFYGTLMVYLKPLHTYSVKDSVATVMYAVVTP" (SEQ ID
 NO:84).
 BASE COUNT 134 a 196 c 126 g 190 t
 ORIGIN
 45 1 cttcactgac ctctctttg tcaccaacac aatccccaag atgctggtga acctccagtc
 61 ccagaacaaa gccatctcct atgcagggtg tctgacacag ctctactcc tggctcctt
 121 ggtggccctg gacaacctca tcttggtgt gatggcgat gaccgctatg tggccatctg
 181 ctgccccctc cactacacca cagccatgag ccctaagctc tgtatcttac tctttcctt
 241 gtgttggtgc ttatctgtgc tctatggcct catacacacc ttctcatga ccacgggtgac
 50 301 cttctgtggg tcacgaaaaa tccactacat cttctgtgag atgtatgtat tctgaggct
 361 ggcatgttcc gacactcaga ttaacacac agtgcgtgatt gccacaggct gctttatctt
 421 cctcattccc ttggattca tgatcattc ctatgtgtg attgtcagag ccatacctcag
 481 aataacctca gtctctaaga aatacaaaag cttctccact tgtgcctccc atttgggtgt
 541 agtctccctc ttctatggga cacttcgtat ggtatacctg aagccctcc atacctactc

601 tgtgaaggac tcagtagcca cagtgatgta tgcggtggtg acaccc (SEQ ID NO:85).

OR59

5 LOCUS AF127872 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY7) gene, partial cds.
ACCESSION AF127872
KEYWORDS .
SOURCE Barbary ape.
10 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY7"
30 CDS <1..>649
/gene="MSY7"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSICIIPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
35 TLLLTVMAYDRFVA VCHPLHYVTIMNRLCGLLVFVTWLIGVMTPLLHISLLTHLTFC
KDFEIPHFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKEKALSTCGSHLSIVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID
NO:86).
BASE COUNT 129 a 190 c 127 g 203 t
40 ORIGIN
1 ctgggtgac atctgttca gcatctgcat catccccaag atgctggtga acatccagac
61 caagaacaaa accatctctt acatggactg cctcaccag gtctatttct ccatgtttt
121 tcctattctg gacacgctac tctgaccgt gatggcttat gaccggttg tggccgctctg
181 ccacccctg cactatgtaa ccatcatgaa ccccgccctc tgcggcctcc tggttttgt
45 241 cagtggtctc attggtgtca tgacacccct cctccatatt tctctgtga cgcactaac
301 ctctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacaca tcctccagct
361 ggctgctct gatacttcc tgaacagcac gttgatatat gttatgacag gtgtgctggg
421 cgttttccc ctcttggtga tcatcttc ttattcaga atcgcttcat cctaaggaa
481 gatgtctca tctgggggaa aagagaaagc actttctacc tgtggctctc acctctccat
50 541 cgtttctta tttatggga caggcattgg ggtccattc acttctgagg tgactcattc
601 ttccagaac atctccgtg cctcgtgat gtacacgtg gttaccccc (SEQ ID NO:87).

OR60

LOCUS AF127873 645 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus MSY8 pseudogene, partial sequence.
5 ACCESSION AF127873
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..645
/organism="Macaca sylvanus"
25 /db_xref="taxon:9546"
gene <1..>645
/gene="MSY8"
/pseudo
BASE COUNT 117 a 185 c 142 g 201 t
30 ORIGIN
1 cttgttgac atctgttta tctccaccac cgtccccagg atgctgatga acatccaggc
61 atggagcaaa gacatctcct acgtgggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatacttcc tactggccat gatggcctat gaccgggttg tggccatctg
181 ccacccctg cactacacgg tcacatgaa cccctgcctc tgggcatcc tggttctggc
35 241 atcttgattc atcattttat gggctcctc agttcatatt ctactgatga agagttgat
301 ctccataggc actgagattc cgcatttctt ctgtgaactg gctcagggtcc tcaagggtgcc
361 cgctctgata ctctctcgt taacattgtc ttgtatgtgg ccacagcact gctgggtgtg
421 ctctctgtag ctgggatact ctctcctac tctcagatcg tctcctcctt aatgaggatg
481 tcctccaccg agggcaagta caaagccttt tccacctgtg ggtctcacct ctgtgtggtc
40 541 tcctgtttct atggaacagg acttggggtc tatctcagtt ctgctgtgac ccattcttcc
601 cagagcagct ccatggcctc agtgatgtac accatgggtca ccccc (SEQ ID NO:88).

OR61

45 LOCUS AF127874 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY9) gene, partial cds.
ACCESSION AF127874
KEYWORDS .
SOURCE Barbary ape.
50 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)

Parameter	Value	Unit
Initial temperature	25.0	°C
Final temperature	100.0	°C
Heating rate	10.0	°C/min
Sample weight	0.5000	g
Sample size	1.0000	cm
Sample thickness	0.1000	cm
Sample density	1.2000	g/cm ³
Sample area	0.7854	cm ²
Sample volume	0.0785	cm ³
Sample mass	0.0942	g
Sample surface area	1.5708	cm ²
Sample perimeter	3.1416	cm
Sample circumference	3.1416	cm
Sample radius	0.5000	cm
Sample diameter	1.0000	cm
Sample height	0.1000	cm
Sample width	0.1000	cm
Sample depth	0.1000	cm
Sample length	0.1000	cm
Sample area ratio	0.7854	cm ² /cm ²
Sample volume ratio	0.0785	cm ³ /cm ³
Sample mass ratio	0.0942	g/g
Sample surface area ratio	1.5708	cm ² /cm ²
Sample perimeter ratio	3.1416	cm/cm
Sample circumference ratio	3.1416	cm/cm
Sample radius ratio	0.5000	cm/cm
Sample diameter ratio	1.0000	cm/cm
Sample height ratio	0.1000	cm/cm
Sample width ratio	0.1000	cm/cm
Sample depth ratio	0.1000	cm/cm
Sample length ratio	0.1000	cm/cm
Sample area ratio (cm ² /cm ²)	0.7854	cm ² /cm ²
Sample volume ratio (cm ³ /cm ³)	0.0785	cm ³ /cm ³
Sample mass ratio (g/g)	0.0942	g/g
Sample surface area ratio (cm ² /cm ²)	1.5708	cm ² /cm ²
Sample perimeter ratio (cm/cm)	3.1416	cm/cm
Sample circumference ratio (cm/cm)	3.1416	cm/cm
Sample radius ratio (cm/cm)	0.5000	cm/cm
Sample diameter ratio (cm/cm)	1.0000	cm/cm
Sample height ratio (cm/cm)	0.1000	cm/cm
Sample width ratio (cm/cm)	0.1000	cm/cm
Sample depth ratio (cm/cm)	0.1000	cm/cm
Sample length ratio (cm/cm)	0.1000	cm/cm
Sample area ratio (cm ² /cm ²)	0.7854	cm ² /cm ²
Sample volume ratio (cm ³ /cm ³)	0.0785	cm ³ /cm ³
Sample mass ratio (g/g)	0.0942	g/g
Sample surface area ratio (cm ² /cm ²)	1.5708	cm ² /cm ²
Sample perimeter ratio (cm/cm)	3.1416	cm/cm
Sample circumference ratio (cm/cm)	3.1416	cm/cm
Sample radius ratio (cm/cm)	0.5000	cm/cm
Sample diameter ratio (cm/cm)	1.0000	cm/cm
Sample height ratio (cm/cm)	0.1000	cm/cm
Sample width ratio (cm/cm)	0.1000	cm/cm
Sample depth ratio (cm/cm)	0.1000	cm/cm
Sample length ratio (cm/cm)	0.1000	cm/cm
Sample area ratio (cm ² /cm ²)	0.7854	cm ² /cm ²
Sample volume ratio (cm ³ /cm ³)	0.0785	cm ³ /cm ³
Sample mass ratio (g/g)	0.0942	g/g
Sample surface area ratio (cm ² /cm ²)	1.5708	cm ² /cm ²
Sample perimeter ratio (cm/cm)	3.1416	cm/cm
Sample circumference ratio (cm/cm)	3.1416	cm/cm
Sample radius ratio (cm/cm)	0.5000	cm/cm
Sample diameter ratio (cm/cm)	1.0000	cm/cm
Sample height ratio (cm/cm)	0.1000	cm/cm
Sample width ratio (cm/cm)	0.1000	cm/cm
Sample depth ratio (cm/cm)	0.1000	cm/cm
Sample length ratio (cm/cm)	0.1000	cm/cm
Sample area ratio (cm ² /cm ²)	0.7854	cm ² /cm ²
Sample volume ratio (cm ³ /cm ³)	0.0785	cm ³ /cm ³
Sample mass ratio (g/g)	0.0942	g/g
Sample surface area ratio (cm ² /cm ²)	1.5708	cm ² /cm ²
Sample perimeter ratio (cm/cm)	3.1416	cm/cm
Sample circumference ratio (cm/cm)	3.1416	cm/cm
Sample radius ratio (cm/cm)	0.5000	cm/cm
Sample diameter ratio (cm/cm)	1.0000	cm/cm
Sample height ratio (cm/cm)	0.1000	cm/cm
Sample width ratio (cm/cm)	0.1000	cm/cm
Sample depth ratio (cm/cm)	0.1000	cm/cm
Sample length ratio (cm/cm)	0.1000	cm/cm
Sample area ratio (cm ² /cm ²)	0.7854	cm ² /cm ²
Sample volume ratio (cm ³ /cm ³)	0.0785	cm ³ /cm ³
Sample mass ratio (g/g)	0.0942	g/g
Sample surface area ratio (cm ² /cm ²)	1.5708	cm ² /cm ²
Sample perimeter ratio (cm/cm)	3.1416	cm/cm
Sample circumference ratio (cm/cm)	3.1416	cm/cm
Sample radius ratio (cm/cm)	0.5000	cm/cm
Sample diameter ratio (cm/cm)	1.0000	cm/cm
Sample height ratio (cm/cm)	0.1000	cm/cm
Sample width ratio (cm/cm)	0.1000	cm/cm
Sample depth ratio (cm/cm)	0.1000	cm/cm
Sample length ratio (cm/cm)	0.1000	cm/cm
Sample area ratio (cm ² /cm ²)	0.7854	cm ² /cm ²
Sample volume ratio (cm ³ /cm ³)	0.0785	cm ³ /cm ³
Sample mass ratio (g/g)	0.0942	

5 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille,
Montpellier Cedex 5 34396, France

source 1..649

gene <1..>649

15 /gene="MSY9"

/gene="MSY9"

20 /translation="LADIGFTSTTVPKMLVNIQAQSNAISYAGCISQMYFFMVFGGID

TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLVSWFLSLSYSLSLIQSLLMLQLSFC

NO:89).

ORIGIN

30 181 tcacccctg tactacctg tcattatgaa ccccgccctc tgtggcctgc tggttctgt

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301 cttttgcacc agttgggtca ttacgcatt ttactgcgag ctgtctcagg ccctcacgct

361 tgcctgctca gacacacaca tcaattacat cctgctctac gtggtgaccg gccttctggg

421 tttttgtccc ttctcaggaa tctttttctc ctacacccaa attgtctctt ccattctgag

481 aatctcatcc acagatggga aacacaaagc cttttctacc tgcggatctc atctgtctgt

54] ggttttttta ttctatggga caggccttgg tctgtatctt agttccaatg catcgtcctc

601 ttccctggcggg ggcattggtgg cctcggtcac gtacactgtg gtcacccc (SEQ ID NO:90).

40

DEFINITION *Callithrix jacchus* olfactory receptor (CJA21) gene, partial cds.

KEYWORDS

45 SOURCE *Callithrix jacchus*.

Eukaryota: Metazoa: Chordata: Craniata: Vertebrata: Mammalia:

REFERENCE 1 (bases 1 to 649)

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>649

/gene="CJA21"

CDS <1..>649

/gene="CJA21"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICVTSTTLPKTLSNIQTHSKVITYAGCVTQLYFFVLFIGLD

SLLPTVMAYDRFVAICHPLHYTVIMNPQFCGLLVLSWIMSALHSLTESLMVYPLLFC

TDLKIPQFFCEIHQIIQFACSDTFLNNLVMYLSTVLLGGGPLAGILYSYSKIASSIRA

ISSAEGKYKAFSTCASHLSVVSIFYCTGLGVYLSAATHSSLSSAAASVMYTVVTP" (SEQ ID

NO:91).

BASE COUNT 137 a 184 c 133 g 195 t

ORIGIN

1 cttgtggac atctgtgta cctccaccac acttccgaag acactgtcaa acatccagac

61 acacagcaaa gtcacacact atgcaggctg cgtcaccagc ttgtactctt ttgtactctt

121 catagggttg gacagcttac tcccgaaccg gatggcctat gaccgggttg tggccatctg

181 tcaccccttg cactacacgg tcacatgaa ccctcagtc tgggactgc tgggtctggt

241 gtcttgatc atgagtggc tgcatcttt gacagaaagc ttaatggtat acccactgct

301 ctttgtaca gactgaaaa tccccagtt ttctgtgaa atcatcaga taattcaatt

361 tgctgttct gacaccttc taataacct ggtgatgat ttgtcaactg tgctcctggg

421 cgggtgtccc ctgctggga tcctgtactc ttactctaag atagcttct ctatactgc

481 aatcctca gctgagggga agtacaaggc atttccacc tgtgcatctc acctctcagt

541 tgtctccta ttattgta caggcctagg ggtgtacctg agttctgctg caaccacag

601 ctactctca agcgcagcag cctcgggtgat gtacacagtg gtcaccccc (SEQ ID NO:92).

OR63

LOCUS AF127876 649 bp DNA PRI 28-FEB-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA22) gene, partial cds.

ACCESSION AF127876

KEYWORDS

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>649
 /gene="CJA22"
 CDS <1..>649
 /gene="CJA22"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDICFTSTTVPKILVNIQE QSGTISYAGCIAQMYFFMVFGGMD
 TFLLTVMAYDRYVAICHPLSYPVIVNPRLCGLLVLSWFLSLSYSLLMLRLSFC
 TSWVIQHFYCELAQVLTACSDTHVNYILLYMVTGLLGCVPFSGILFSYIQIVSSILR
 IPSTDGKHKAFTSCGSHLSVVSIFYGTGLGVYLSSNASSSSWWGMVASAMYTVVTP" (SEQ ID

NO:93).

BASE COUNT 112 a 193 c 140 g 204 t
 ORIGIN

1 cttggtgac atctgtttca cctccaccac agtccccaag attctggtga acatccagga
 61 gcagagtgtg accatcagct atgcaggctg cattgcccag atgtattttt tcatggtttt
 121 tggaggcatg gacacatttc tctcactgt gatggcctat gaccggtatg tggctatctg
 181 tcacccctg tctaccctg tcattgtaa cccccgctc tgcggcctgt tggttctgt
 241 gtctgtgttc ctcagctgt cactactcct gatccagagt ctgtgatgc tgcggctatc
 301 cttctgcacc agtgggtga ttcagcactt ttactgtgag ctgtctcagg ttctcacgt
 361 tgctgtctca gacacacatg tcaattacat cctgctctac atggtgaccg gccttctggg
 421 ctgtgtccc ttctcaggga tcttttctc ctacatccaa attgtctcct ccatcctgag
 481 aatcccatcc acagatggga aacataaagc cttttctacc tgtggatctc atctgtctgt
 541 ggtttcttta ttctacggga caggccttgg tgtctacctt agtccaatg cctcgtctc
 601 ttctgtgtgg ggcagtgtgg cctcagccat gtacacagt gtcaccct (SEQ ID NO:94).

OR64

LOCUS AF127877 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA23) gene, partial cds.
 ACCESSION AF127877
 KEYWORDS .

SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>649
 /gene="CJA23"

CDS <1..>649
 /gene="CJA23"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDICFTTVIVPRMLVNFLSGTKVIPYMGCLVQMYFFMAFGNTD
 SYLLASMAIDRLVAICNPLHYDVAMNPRHCLLMLLGSCSISHLHSLFRVLLMSHLSFC
 ASHVIKHHFFCDTQPVLKLSCSDTSSSQMVVMTETLA VIVTPFLCIHFSYLRIITVLR
 IPFAAGKWRAFSTCGSHLTVVALFYGSIYYVYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID

NO:95).

BASE COUNT 126 a 192 c 139 g 192 t
 ORIGIN

1 ttccaggat atctgctca caacagtc atgcccagg atgctggtga atttctatc
 61 agggacaaag gttatccct acatgggctg cctggtccaa atgtactct tcatggcctt
 121 tgggaacact gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
 181 caaccctta cactatgatg tggctatgaa cccccggcat tgcctactca tgctattggg
 241 ttctgtagc atctcccacc tacattcct gtccgggtg ctactatgt ctacactgtc
 301 ttctgtgcc tcccagctca ttaagcactt ttctgtgac acccagcctg tgctaaagct
 361 gtctgctct gacagtcct ccagccagat ggtggtcatg actgagactt tagctgtcat
 421 tgtgacccc ttctgtgta tcatcttctc ctactgcga atcatcatca ctgtgctcag
 481 aatccccctt gcagctggga agtggagggc ctctctacc tgtggtccc acctactgt
 541 agtagccctt tctacggga gtatatatta tgtctatctt aggccctgt ccatgtactc
 601 agtgggaag gaccgagtag ccacagttat gtacacagta gtgacaccc (SEQ ID NO:96).

OR65

LOCUS AF127878 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA24) gene, partial cds.
 ACCESSION AF127878
 KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>649

/gene="CJA24"

CDS <1..>649

/gene="CJA24"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAVLD

VFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
 TDLEIPHFFCELNQVIHLACSDTFLNDVVMYLA AVLGGGPLAGILYSYSKIVSSIRA
 ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP" (SEQ ID

NO:97).

5 BASE COUNT 136 a 177 c 134 g 202 t

ORIGIN

1 cttttagac atctgtttg tgtctaccac tgtcccaaag atgtggtaa atatccagac
 61 acacagcaaa gtcacacct ttgcaggctg catcacccag ataggccatt gcctactctt
 121 tgcagtattg gacgtcttta tgtctactgt gatggcctat gaccggtatg tggccatctg
 10 181 tcacccactg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
 241 atcctggatc ctgagtggcc tgaattctc attacaacc ttaatagtgc tgcggcttgc
 301 cttctgcaca gacttggaaa tccccactt ttctgcgaa ctaatacagg tcatccacct
 361 tgcctgttct gacactttc ttaatgatgt ggtgatgtat ttggccgctg tgctgctggg
 421 ggggtggccc ctgcaggga ttcttactc ttactctaag atagtctc ccatcgtgc
 15 481 aatctcatca gtcagggga agtacaaggc atttccacc tgtgtatctc acatctaat
 541 tgcctccta ttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
 601 ctcacattca agagctgcag cctcgggtgat gtacactgtg gtcaccccc (SEQ ID NO:98).

OR66

20

LOCUS AF127879 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA25) gene, partial cds.
 ACCESSION AF127879
 KEYWORDS .

25

SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

30

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

35

JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

40

FEATURES Location/Qualifiers
 source 1..649
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 /db_xref="taxon:9483"

45

gene <1..>649
 /gene="CJA25"
 CDS <1..>649
 /gene="CJA25"
 /codon_start=2
 /product="olfactory receptor"
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 TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
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NO:99).

BASE COUNT 130 a 183 c 136 g 200 t

ORIGIN

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1 ctttctgac atctgttca catccacgac cgtcccaaag atgctggtgg atatccaaac
61 acaaagcaaa atgatactt ttgcagggtg cctcaccag attttttt tcgttgcatt
121 tggatgctg gacaattgc tctgaccgt gatggcctat gaccgggtcg tggccatctg
181 tcacccctg cactacgcgg tcacatgaa cccccggctc ttagactgc tagttctggg
241 gtctggtgc atcagtgtca tggtttctc gctcgagacc ttgaccattt tgaggctgct
301 cttctgcaca aacatggaaa tcccacactt ttttgtgat gttctcgaag tcctgaagct
361 cgctgttct gaaacctcg tcaataaaat cgtgatgtat ttttgacaa ttgcaatggg
421 tgttttctc ctctctgaa tcctatactc ttattctcag attttctct ccatctgag
481 agtatcacct gccaaggcc agcacaagc ctttccacc tgggggtc acctctcagt
541 ggtcacctg ttcatggca cgggcctgg ggtatatctc agtcttcag ctacaccatc
601 tttaggaca agtctgatg cctcggtgat gtacacatg gtcacccc (SEQ ID NO:100).

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OR67

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LOCUS AF127880 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA26) gene, partial cds.
ACCESSION AF127880
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA26"
CDS <1..>649
/gene="CJA26"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGLTSTTVPRITVNIQTHSRVIAYASCLTQMSFSIFFVCME
DMLLAVMAYDRFVAICHPLHYPVIMSPRLCGFLVLVSAFLSLLISQVHNLIVLQFSCF
KDIKISNFFCDPSQLLTLACSDTFVNNIVMNFFAAVFGFLPISGIFLSYYKIVSSIL
RVPSSSGKYKAFSTCSSHLAVVCLFYGTVLGVYLGSSVSSPRKRVVTSVMYTVVTP" (SEQ ID
NO:101).
BASE COUNT 138 a 161 c 124 g 226 t
ORIGIN
1 cttgctgac attggttga cctccaccac cgtcccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atgcaagctg cctgacacag atgtctttt caatctttt
121 tgtgtgatg gaagacatgc tcctgtctgt gatggcctat gaccggttg tggccatctg
181 tcacccctg cactatccag tcacatgag cccacgactc tgggcttct tagtgttgg

```

241 gtctgctttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaatttc
 301 ttgcttcaaa gatataaaga ttctaattt ctctgtgac ctttctaac tctcacact
 361 tgcttggtcc gacacgttg tcaataacaa catagtcag aatttcttg ctgctgtatt
 421 tggttttctt cccatctcag ggaatctttt gtcttactat aaaattgtt cctccattct
 5 481 gagagtcca tcatcaagtg ggaagtataa agccttctct acctgtagct ctcacctggc
 541 agttgttgc ttatttatg gaacagtcct tggagtgtac ctggggtcat cagtgtcatc
 601 cccaggaag agagtgtga cctcagtgat gtacacagtg gtcactccc (SEQ ID NO:102).

OR68

LOCUS AF127881 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA62) gene, partial cds.
 ACCESSION AF127881
 KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>649

/gene="CJA62"

CDS <1..>649

/gene="CJA62"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKTLVNIQTHSKVITFAGCITQIGHCLLFAVLD

VFMLTVMAYDRYVAICHPLHYTVINPRLCGLLVLASWILSALNSSLQTLIVRLSFC

TDLEIPHFVCVLNQVIHLACSDTFLNDVVMYLA AVLGGGPLAGILYSYSKIVSSIRA

ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP" (SEQ ID

NO:103).

BASE COUNT 133 a 179 c 135 g 202 t

ORIGIN

1 cttttagac atctgtttg tgtctaccac tgtccgaag acgctggtaa atatccagac
 61 acacagcaaa gtcacacct ttgcaggctg catcacccag ataggccatt gcctctctt
 121 tgcagtattg gacgtcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
 181 tcaccactg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
 241 atctggatc ctgagtccc tgaattctc attacaacc ttaatagtgc tgcggcttc
 301 ctctgcaca gacttggaat tccccactt ttctcgcta ctaatcagg tcatccacct
 361 tgctgttct gacactttc ttaatgatgt ggtgatgtat ttggccgctg tgctgctggg
 421 ggggtggtccc ctgcaggga ttcttactc ttactctaag atagtttct ccatcgtgc
 481 aatctcatca gtcagggga agtacaaggc atttccacc tgtgtatctc acatcttaat

541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agagctgcag cctcgggtgat gtacactgtg gtcaccccc (SEQ ID NO:104).

OR69

5 LOCUS AF127882 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA80) gene, partial cds.
ACCESSION AF127882
KEYWORDS .
10 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
15 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA80"
30 CDS <1..>649
/gene="CJA80"
/codon_start=2
/product="olfactory receptor"
/translation="FTDICFTTVIVPRMLVNFLSETKVISYMGCLVPMYFFMAFANTD
35 SYLLASMAIDRLVAICNPLHYDVAMNSRRCLLMLLGSCSISHLHSLFRVLLMSRLSFC
ASHVIKHFFCDTQPVLKLSCSDTSSSQMVVMTETLA VIVTPFLCIIFSYLRIITVLR
IPSAAGKWRAFSTCGSHLTVVALFYGSIHYVYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID
NO:105).
BASE COUNT 123 a 194 c 139 g 193 t
40 ORIGIN
1 ttccacggat atctgctca caacagtcac agtgcacagg atgctggtga attttctac
61 agagacaaag gttatctct acatgggctg cctgggtcca atgtacttct tcatggcctt
121 tgcgaacct gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
181 caacccctta cactatgatg tggctatgaa ctcccggcgt tgctactca tgctattggg
45 241 ttcttgagc atctccacc tacatccct gtccgggtg ctactatgt ctgcctgtc
301 ttctgtgcc tcccagtc ttaagcatt ttctgtgac acccagcctg tgctaaaget
361 gtctgctct gacagtcct ccagccagat ggtggtcatg actgagacct tagctgttat
421 tgtgacccc ttctgtgta tcattcttc ctacctgca atcatcatca ctgtgctcag
481 aatccctct gcagccggga agtggagggc ctctctacc tgggtctccc acctcactgt
50 541 agtagccct ttctacggga gtattatta tgtctatgt aggccctgt ccatgtactc
601 agtggtaga gaccagtag ccacagtat gtacacagta gtgacaccc (SEQ ID NO:106).

OR70

LOCUS AF127883 649 bp DNA PRI 28-FEB-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA81) gene, partial cds.

5 ACCESSION AF127883

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

10 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
20 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

25 gene <1..>649

/gene="CJA81"

CDS <1..>649

/gene="CJA81"

/codon_start=2

30 /product="olfactory receptor"

/translation="FADICFTSTTVPKMLVDIQTQSKMITFAGCLTQIFFFVAFGCLD

NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGSWCISVMVSLLETILTILRLSFC

TNMEIPHFCDVLEVLKLACSETLVNKMVYFVTIAMGVFPLSGILYSYSQIFSSILR

VSPAQQQHKAFASTCGSHLSVVTLFYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID

35 NO:107).

BASE COUNT 130 a 184 c 136 g 199 t

ORIGIN

1 ctttgcgtgac atctgcttca catccacgac cgtcccaaag atgctggtgg atatccaaac

61 acaaagcaaa atgatcactt ttgcagggtg cctcaccag attttttt tcgttcatt

40 121 tggatgcctg gacaatttc tctgaccgt gatggcctat gaccggtcg tggccatctg

181 tcacccctg cactacgcgg tcatcatgaa cccccggctc ttagactgc tagttctggg

241 gtctcgtgac atcagtgtca tggtttctc gtctgagacc ttgaccatt tgaggctgac

301 cttctgcaca aacatggaaa tccacactt ttttgtgat gttctgaag tctgaagct

361 cgctgttct gaaacctcg tcaataaaat cgtgatgat ttgtgacaa ttgcaatggg

45 421 tgttttctc ctctctggaa tcttatactc ttattctcag atttctcct ccactctgag

481 agtatcacct gccaagggc agcacaagc ctttccacc tgggggtc acctctcagt

541 ggtcacctg ttctatggca cgggcctgg ggtatatctc agttctgcag ctacaccac

601 ttctaggaca agtctgatg cctcgggatg gtacaccatg gtcaccccc (SEQ ID NO:108).

50 OR71

LOCUS AF127884 649 bp DNA PRI 28-FEB-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA82) gene, partial cds.

ACCESSION AF127884

KEYWORDS .

SOURCE *Callithrix jacchus*.

ORGANISM *Callithrix jacchus*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; *Callithrix*.

REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"

gene <1..>649
/gene="CJA82"

CDS <1..>649
/gene="CJA82"
/codon_start=2
/product="olfactory receptor"
/translation="FADICFTSTTVPKMLVGIQTQSKMITFAGCLTQIFFFVAFGCLD
NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGSWCISVMVSLLETILTILRLSFC
TNMEIPHFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
VSPAQQQHKAFASTCGSHLSVVTLFYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID
NO:109).

BASE COUNT 129 a 183 c 137 g 200 t

ORIGIN

1 ctttgcgtgac atctgtttca catccacgac cgtcccaaag atgctggtgg gtatccaaac
61 acaaagcaaa atgatcactt ttgcagggtg cctcaccag atttttttt tegtgcatt
121 tggatgcctg gacaattgc tctgaccgt gatggcctat gaccggtcg tggccatcg
181 tcacccctg cactacgcgg tcatcatgaa cccccggctc ttagactgc tagttctggg
241 gtccgtgtgc atcagtgtca tggtttctc gctcgagacc ttgaccatt tgaaggctgc
301 ctctgcaca aacatggaaa tccacactt ttttgtgat gttctcgaag tctgaagct
361 cgctgttct gaaaccctcg tcaataaaat cgtgatgtat tttgtgaaa ttgcaatggg
421 tgttttctc ctctctggaa tctatactc ttattctcag attttctcct ccatcctgag
481 agtatcacct gcccaaggcc agcacaaagc ctttccacc tgtgggtctc acctctcagt
541 ggtcacctcg ttctatggca cgggccttgg ggtatatctc agttctgcag ctacaccatc
601 ttctaggaca agtctgatgg cctcggtgat gtacaccatg gtcaccccc (SEQ ID NO:110).

OR72

LOCUS AF127885 658 bp DNA PRI 28-FEB-2000

DEFINITION *Pongo pygmaeus* PPY10 pseudogene, partial sequence.

ACCESSION AF127885

KEYWORDS .

SOURCE *orangutan*.

ORGANISM *Pongo pygmaeus*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; *Pongo*.

REFERENCE 1 (bases 1 to 658)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 658)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..658

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>658

/gene="PPY10"

/pseudo

BASE COUNT 131 a 176 c 135 g 216 t

ORIGIN

1 cttgctgac atcggttca cctcccgc atgtcccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatttct aggcaggcta cctgactcag atgtctctct ttgccatitt
121 tggaggcgtg gaagagagac atgctcctga gtgtgaaggc ctatgaccgg ttgtagcca
181 cctgtcacc tcgtatcat tcagccatca tgaagtcag ttctgtggc ttctagttt
241 tgtgtcttt tttttctc tcagtcttt agacgccaa ctgcacaact tgattgcctt
301 gcaaatgcc tgcttgagg atgtggaat ttctaattc ttctgtgacc ctctcaact
361 cccctcttg catgttgga cagcttcacc gataacatca tcacgtatct cctgacgcc
421 atatccctc ttattccat ctgggggacc cttttctc taatatcaa ttgttctc
481 cattctgagg gcttcatcat caggtgggag gtataagcc ttctccatct gtgggtctca
541 cctgtcagtt gttgcttat ttatggaac aggcataatg gggtacctca gttcagatgt
601 gtcattctc ctgagaaagg ctgcagtgc ctgagtgtg tacaccgtgg tcaccccc (SEQ ID NO:111).

OR73

LOCUS AF127886 649 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY11) gene, partial cds.

ACCESSION AF127886

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Pongo pygmaeus"

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/db_xref="taxon:9600"
gene      <1..>649
          /gene="PPY11"
CDS       <1..>649
5         /gene="PPY11"
          /codon_start=2
          /product="olfactory receptor"
          /translation="LADIGFTSTTVPKMIVDMQTHSRVISYAGCLTQMSFFVLFACMD
10        DMLLSVMAYDRFVAICHPPDYPVTMNPFCGFLVLLSFFLSLLDSQLHNWIALQITCF
          KDVEIPNFFCDPSQLPHLACCDTFTNDIVMYFLAAIFGFLPILGILFSYYKIVSSILR
          VSSSGGRYKAFATCGSHLSVVCLFYGTALGGYLSSDMSSYPRKGAVASVMYTVVTP" (SEQ
ID NO:112).

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BASE COUNT 125 a 174 c 130 g 220 t

ORIGIN

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15      1 cttggctgac atcggtttca cctccaccac ggtccccaag atgattgtgg acatgcaaac
      61 tcacagcaga gtcattcctc atgcaggctg cctgactcag atgtctttt ttgtccttt
      121 tgcattgatg gatgacatgc ttctgagtgt gatggcctat gaccggtttg tggccatctg
      181 tcacctccg gattaccag ttaccatgaa cccatgttcc tgggcttcc tagttttgtt
      241 gtctttttt ctcagtcttt tagactccca gctgcacaat tggattgcct taaaaattac
20      301 ctgctcaag gatgtggaaa ttcccaattt cttctgtgac cttcccaac tccccacct
      361 tgcctgttgt gacaccttca ccaatgacat agtcatgtat ttccttgctg ccatatttgg
      421 tttcttccc atcttgggga tcctttctc ttactataaa atgtttcct ccattctgag
      481 ggtttcatca tcagtgaggga ggtataaagc cttcgccacc tgtggctctc acctgtcagt
      541 tgtttgctta ttttatggaa cagcccttgg aggttacctc agttcagaca tgcctctta
25      601 tccagaaag ggtgcagtgg cttcagtgat gtacacagtg gtcaccccc (SEQ ID NO:113).

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OR74

LOCUS AF127887 654 bp DNA PRI 28-FEB-2000

30 DEFINITION Pongo pygmaeus PPY12 pseudogene, partial sequence.

ACCESSION AF127887

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

35 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 654)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 654)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

45 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..654

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

50 gene <1..>654

/gene="PPY12"

/pseudo

BASE COUNT 124 a 178 c 135 g 217 t

ORIGIN

1 cttgctgaa atcggttca cctccaccac gatccccaag attgtggaca tccaatctca
61 cagcagagtc atctctctg caggcttgcc tgactcagat gtctcttgc catttttga
121 ggacacggaag agagacatgc tctgagtgt gatggcctat gaccggttg tagccatctg
181 tcacctcta tatcattcag tcatcatgag cccgtgttgc tgggcttcc tagttttgt
241 gtctttttt ttcttctcag tcttttagac tcccagctgc accacttgat tgccttgcta
301 atgacctact tcaaggatgt ggaaattccg aatttctct gtgaccttc taaactccc
361 catattgcat gttgtgatgc cttaccaat aacatcatca tgtattccc tgtaacatg
421 ttgcttttc ttcccatctc ggggactctt ttctcttact ctaatatgt ctctccatt
481 ctgagggtt cgtcatcagg tgggaaatat aaagccctct ccacctgtgg gtctcactgg
541 tcagttgtt gctgagcttc tggaacaggc gttggagggt acctcagttc agatgtgtca
601 tctcccccga gaaagggtgc agtggcctca gtgatgtgca ccgtggtcac cgcc (SEQ ID NO:114).

OR75

LOCUS AF127888 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY49) gene, partial cds.
ACCESSION AF127888

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>649

/gene="PPY49"

CDS <1..>649

/gene="PPY49"

/codon_start=2

/product="olfactory receptor"

/translation="FVDTCFISTTPKMLVNIQARSKEISYMGCLTQVYFLMMFAGMD

TFLAVMAYDRFVAICHPLQYAVIMNPHLCGLLVLASWFIIFWVSLVHILLMKRLTFS

TGTEIPHFFCELAQVLKVARSDTLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR

MSSTEGKYKAFSTCGSHLCVVSFLNGTGLGVYLSSAVTHSSQSSSMASVAMYAMVTP" (SEQ

ID NO:115).

BASE COUNT 119 a 187 c 146 g 197 t

ORIGIN

1 cttgtggac acctgtttca tctccaccac agtccccaag atgctagtga acatccaggc
61 acggagacaaa gaaatctct acatgggggtg cctcactcag gtgtatttt taatgatgtt
121 tgetggaatg gatactttcc tactgctgt gatggcttat gaccggttg tggccatctg
181 ccacccctt cagtacgagg tcatcatgaa ccccatctc tgtggcctgc tggttctggc

241 atcttggttc atcattttct gggtctccct gggtcatatt ctactgatga agaggctgac
 301 cttctccaca ggcactgaga ttccgcatft cttctgtgaa ctggctcagg tcctcaaggt
 361 ggcccgctct gataccctcc tcaataacat tgtcttgat gtggccacgg cactgctggg
 421 tgtgtttcct gtagctggga tcctcttctc ctactctcag atcgtctcct ccttaatgag
 481 aatgtctccc accgagggca agtacaagc ctttccacc tgtggatctc acctctgtgt
 541 ggtctccttg ttcaatggaa caggactggg ggtctatctc agttctgctg tgaccattc
 601 ttccagagc agctccatgg cctcagtgat gtatgccatg gtcaccccc (SEQ ID NO:116).

OR76

LOCUS AF127889 660 bp DNA PRI 28-FEB-2000
 DEFINITION Pongo pygmaeus PPY50 pseudogene, partial sequence.
 ACCESSION AF127889
 KEYWORDS .
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
 REFERENCE 1 (bases 1 to 660)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 660)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..660
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>660
 /gene="PPY50"
 /pseudo
 BASE COUNT 122 a 181 c 146 g 211 t
 ORIGIN
 1 cttgctgac atcagtttca cctccaccac ggtccccaag atgattgtgg acatccaatc
 61 tcacagcaga gtcattctct atgcaggctg cctgactcag atgtgtctcc tggccatttt
 121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg ttgtagccc
 181 tctgtcacc tctatatcgt tcagccatct tgaaccctg tttctgtggc ttctagatt
 241 tgtggtcttt gttttcttt tcctcagtct ttagactcc cagctgcgca acttgattgc
 301 cttagcatg acctgcttca aggatgtgga aattcctaatt ttctctggg aaccttctca
 361 actcccccatt ctacatttt gtgacacctt caccagtaac atccacatgt atttccctgc
 421 tgccgtatt ggttttcttc ccatctcggg ggcccttttc tcttacgta aaattgttc
 481 ctccattctg agggtttcat catcagggtg gaagtatcaa ctttctccac ctgtgggtct
 541 cacctgtcag ttgttgctg attttacgga acaggcgttg gagggtagct gggttcagat
 601 gtgtcatccc ccccagaaaa gggtgcagtg gcctcagtga tgtacacggt ggtcaccccc (SEQ ID NO:117).

OR77

LOCUS AF127890 648 bp DNA PRI 28-FEB-2000
 DEFINITION Pongo pygmaeus PPY51 pseudogene, partial sequence.
 ACCESSION AF127890

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>648

/gene="PPY51"

/pseudo

BASE COUNT 128 a 183 c 134 g 203 t

ORIGIN

1 ctttctgac atctgtttt tgcttagcac tctaccaaag atgctggtga atatccagac
61 acacagcaaa gtcacacct atgcaggctg catcaccag gtgtgctttt tegtattctt
121 tgcaggattg gacatcttct tctgactgt gatggcctat gacggtttgt ggccatctgt
181 caccctctgc actacacggt catcatgagc cccaggctct gtggactgct ggttctggca
241 tctggatca tgagtgcct gaattcctg ctacaaagct taatagtact gcggctttcc
301 ttctgcacag atttggaat cccctactt ttctgtgaac taatcaggt caccacatt
361 gcctgttctg acacctttct taacgacatg gtgatgtatt tgcactctgc gttgtggggc
421 ggtgctcccc tcactgggat ccttactct tactctaaga ttgttcctc catacgtgca
481 atctcatcag ctacggggaa gtacaaggca tttccacct atgcgtctca cctctcagtt
541 gtctcttat ttatgggtac actcctaggg gtgtacctta gttctgctgc aaccacaac
601 tcatactcaa gtgctgcagc ctggtgatg tactgtgg tcaccccc (SEQ ID NO:118).

OR78

LOCUS AF127891 660 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY52 pseudogene, partial sequence.

ACCESSION AF127891

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY52"
/pseudo

BASE COUNT 122 a 181 c 146 g 211 t

ORIGIN

1 cttgctgac atcatttca cctccaccac ggtccccaag atgattgtgg acatccaatc
61 tcacagcaga gtcattcct atgcaggctg cctgactcag atgtgtctcc tggccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg ttgtagccc
181 ttgttcaccc tctatctgt tcagccatct tgaacccgtg ttctgtggc ttcctagatt
241 tgtggtcttt gttttcttt tctcagctt ttagactcc cagctgcgca acttgattgc
301 cttagcatg acctgcttca aggatgtgga aattcctaatt ttctctggg aaccttctca
361 actccccat ctacatttt gtgacacct caccagtaac atccacatgt atttccctgc
421 tgccgtatt ggtttcttc ccatctcggg ggcccttttc tctacgga aaattgtttc
481 ctccattctg agggtttcat catcagggtg gaagtataa ccttctccac ctgtgggtct
541 cacctgtcag ttgttctg attttacgga acaggcgtg gagggtagct gggttcagat
601 gtgtcatccc ccccgagaaa ggggtgcagt gcctcagtga tgtacacgt ggtcaccccc (SEQ ID NO:119).

OR79

LOCUS AF127892 633 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY76 pseudogene, partial sequence.

ACCESSION AF127892

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 633)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 633)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..633
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>633
/gene="PPY76"
/pseudo

BASE COUNT 134 a 155 c 124 g 220 t

ORIGIN

1 cttgctgac attggttca ccttgccac ggtccccaag atgattgtag acatgcaatc
61 acatagcaaa gtcattccc atgcgggctg tctgacacag atatctttt ttgtcctttt

121 tgcattgata gatgacatgc tctgactgt gatggcctat gactgattcg tggccatctg
 181 tcacccctg aactaccag tcacatgaa tctcacctc tgtgtcttct tagtgttgg
 241 gtccttttcc ttagcctgtt ggattcccag ctgcacaatt ggattgttac aattcacctg
 301 cttcaagaat gtggaaatct ttaattttgt ctgtgactga tctcaacctt gcctgttctg
 361 actgtgtcat cagtaacata ttcatacatt tagatagtag aatacttggg ttcttccca
 421 ttccagggat cctttgtct tactataaaa ttgtgccctc cattctaaga attccattgt
 481 cagatgggaa gtataagcc ttctccacct gtggctctca cctggcaatt gttgcttat
 541 ttatggaac aggcattggg gtgtacctga cttcagctgt gtcactatcc ccaggaatg
 601 gtgtggtcag tgtgtatgt tgtggccacc ccc (SEQ ID NO:120).

OR80

LOCUS AF127893 648 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY77 pseudogene, partial sequence.

ACCESSION AF127893

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>648

/gene="PPY77"

/pseudo

BASE COUNT 140 a 172 c 129 g 207 t

ORIGIN

1 ctttctgac ctctgttta cctccacaac cgtcccaaag atgctactga atatactgac
 61 acagaacaaa ttcataacat atgcaggctg tctcggtcag atttctttt tcaattcatt
 121 tggatgcctg gacaatttac tcttgaccgt gatggcctat gaccgcttca tggccatctg
 181 tcacccctg cactacacac ggtcatcatg aaccaccagc tctgtggact gctggttcta
 241 gggctctagt gcatcagtgt catgggtccc tgctcaagac ctgactgtt ttgaggctgt
 301 cctctgcaca aaatggaaat tccacacttt tttgtgatc ttctgaagt cctgaagctc
 361 gcctgttctg acaccttcat caataacgta gtgatatact ttgcaactgg catcctgggt
 421 gtgattccct tcaactggaat acttttctt tactataaaa ttgtttctc tatactgagg
 481 atttcctcag ctgggagaaa gtgcaaagcg ttctccacct gtggttccca cctctcagt
 541 gtcagcttgt tctatggcac aggttttggg gtctatctca gttctgcagc tacaccatct
 601 tctaggacaa gtctggtggc ctactgatg tacaccatgg ttaccccc (SEQ ID NO:121).

OR81

LOCUS AF127894 660 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY78 pseudogene, partial sequence.

ACCESSION AF127894

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..660

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>660

/gene="PPY78"

/pseudo

BASE COUNT 118 a 185 c 140 g 217 t

ORIGIN

1 cttgcctgac atcggtttca cctccaccac ggcccccaag atgattgtgg acatccaatc

61 tcacagcaga gtcattcctc atgcaggctg cctgactcag atgtgtctcc tggccatttt

121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg ttgtagccc

181 tctgtcacc tctatatcgt tcagccatct tgaaccctgt ttctgtggc ttctagatt

241 tgtggtcttt gttttcttt tctcagtct ttagactcc cagctgcaca acttgattgc

301 cttacgcatt accctgttca aggatgtgga aattcctaatt ttctctggg aaccttctca

361 actccccat cttacatttt gtgacacctt caccagtaac atccacatgt atttccctgc

421 tgccgtattt gggtttcttc ccatctcggg ggcccttttc tcttactgta aaactgtttc

481 ctccattctg aggggttcat catcagggtg ggagtatcaa cttctccac ctgtgggtct

541 cacctgtcag ttgttgctt atttatgga acagcccttg gaggtacct cagttcagct

601 gtgtcccttt cctccaggaa ggggtcagtg gcctcagtga tgtacctgt ggtcaccccc (SEQ ID NO:122).

OR82

LOCUS AF127895 649 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY85 pseudogene, partial sequence.

ACCESSION AF127895

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
10 /organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY85"
/pseudo
15 BASE COUNT 118 a 174 c 131 g 226 t
ORIGIN
1 ctggctgac atcagtttg cctctaccac ggtccccaag atgattgtgg acatccaggc
61 tcacagcaga ctcactctt atgtgggctg cctgactcag atgtctttt tgatccttt
121 cgcatgtatg gaaagtctgc tctgactgt gatggcctat gaccggttg aggccatctg
20 181 tcacccctg cactcccaag tcacacgag cccacgactc tgtgcctct tagtttgggt
241 gtctttttt cttagccttt tggactctca gctgcacaat ttgattgtgt tacaacttac
301 ctgcttcaat gatgtggaaa tctctaatt ttcctgtga ccttctcaa cttctcagcc
361 tggcctgttc tgacacctcc attaataaca tggctgtata tttattggt gccatattg
421 gttttctccc tctcttaggg atcctttct cttactataa aattattct tccattctgc
25 481 gagttcgctc ttcagggtgg aagtataag ccttctccac ctgcagctct cacctgtcag
541 ttgtttgctt atttatgga acagcccttg gagggtaacct cagttcagct gtgtcccttt
601 cctccaggaa ggggtgcagt gcctcagtga tgtacctggt ggtcacccc (SEQ ID NO:123).

OR83

30 LOCUS AF127896 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY9) gene, partial cds.
ACCESSION AF127896
KEYWORDS .
35 SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
45 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
50 source 1..649
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY9"

CDS <1..>649
 /gene="PPY9"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFASTTVPKMLVNIQAQSKVITYAGCITQMYFFTHFVGLD
 SFLLTVMAYDRFVAICHPLHYTVIMNPQLCGLLVLASWIMSVLHSLQLSLMVLRLSLC
 RELEIPHFCELNQVIHLACSDTFLDDMVMYLA AVLGGGCLAGILYSYSKIVSSICA
 ISSAQGKYKAFSTCASHLSVVSFLFYCTSLGVYLSSAAIHNSHSSAIASVMYTVVTP" (SEQ ID

NO:124).

BASE COUNT 136 a 173 c 140 g 200 t
 ORIGIN

1 cttttagac atctgttttg cctctaccac ggtcccaaag atgctggtga atatccaggc
 61 acagagcaaa gttatcacct atgcaggctg catcaccag atgtacttt tcacacatt
 121 tgtaggattg gacagcttcc tcctaactgt gatggcctat gaccggttg tggccatctg
 181 tcacccctg cactacacgg tcactatgaa cctcaactc tgtggattgc tggttctggc
 241 gtcctggatc atgagtgtct tgcattcctt attacaaagc ttaatgggac tgcgggtgtc
 301 cttatgcaga gagttggaaa tcccccaactt ttctgcgaa cttatcagg tcacccact
 361 tgcctgttct gacacctttc ttgatgacat ggtgatgtat ttggcagctg tgcctgtggg
 421 tgggggatgt ctcgctggga tccttactc ctactctaag atagtttct ccatatgtgc
 481 aatctcatca gctcaaggga agtataaggc attttccacc tgtgcatctc acctctcagt
 541 tgtctccttg tttattgta cgagcctagg agtgtacctt agctcggctg caatccacaa
 601 ctcacactca agtgcaatag cctcagtgat gtacaccgtg gtcaccccc (SEQ ID NO:125).

OR84

LOCUS AF127897 649 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO27) gene, partial cds.
 ACCESSION AF127897
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>649
 /gene="SBO27"
 CDS <1..>649
 /gene="SBO27"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDFCLATDTIPKMLVSLQTRSKAISYPCCCLTQMYFFHFFGIVD

SVLIAVMAYDRFVAICHPLHYATIMSPRLCGLLVGAPWVVFSCFISLTHILLMARLVFC
 GSLKVPHYLCDLTPILRLSCTDTSVNRIFILTVAGMVIATPFICILASYACILVAIMK
 IPSAGGRKKAFTSCSSHLSVVALFYGTTIGVYLCPSVHTAVKEKASAVMYTVVTP" (SEQ ID

NO:126).

5 BASE COUNT 112 a 218 c 145 g 174 t
 ORIGIN

1 cctggtgat ttctgtctgg ccaccgacac catcccaag atgctggtga gccttcaaac
 61 caggagcaag gccatctctt atccctgctg cctgaccag atgtacttct tccatttct
 121 tggcatcgtg gacagcgtct taattgctgt aatggcgat gaccgcttg tgccatctg
 10 181 ccaccccttg cactacgcca cgatcatgag cccacgcctc tggcgctgc tggcggggc
 241 ccctgggtg ttctcatgct tcactcact caccacatc ctctgatgg cccgcctctg
 301 ttctgctgc agcctcaagg tgcctcatta ctgtgcgac ctactccca tctccgact
 361 ttcgtgcaca gacagctctg tgaacaggat ttcatcctc actgtggcag ggatgggtgat
 421 agccacgccc ttcatctgca tctggcctc ctatgcttg atcctttag ccatcatgaa
 15 481 gatccctct gcaggtggca ggaagaaagc ctctccacc tgcagctccc acctgtccgt
 541 gggtgctctc ttctatggga ccaccattgg ggtctacctg tgcctcctc cgtccacac
 601 cgctgtaag gagaaagctt ctgctgtgat gtacacagta gtcacccc (SEQ ID NO:127).

OR85

20 LOCUS AF127898 646 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO28) gene, partial cds.
 ACCESSION AF127898
 KEYWORDS .
 25 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 30 REFERENCE 1 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 646)
 35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 40 source 1..646
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>646
 /gene="SBO28"
 45 CDS <1..>646
 /gene="SBO28"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LADIGFTSTTVPRITVNIQTHSRVIA YASCLTQMSFSIFFACME
 50 DTLAVMAYDRFVAICHPLHYVIMNPRLCGFLVLSVFLSLLISQVHNLIVLQFSCF
 KEIKISNFFCDPSQLLTLSCSDTFVNIVTNFFAAVFGFLPISGIFFSYKYIAPSILR
 VPLSSGKYKAFSTCSSHLAVVCLFYGTIVGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
 NO:128).
 BASE COUNT 137 a 167 c 122 g 220 t

ORIGIN

1 cttggctgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atgcgagctg cctgacacag atgtctttt caatatttt
121 tgcgtgatg gaagacacgc tcttggtgt gatggcctat gaccggttg ttgccatctg
181 tcacccctg cactaccag tcacatgaa cccacgactc tgtggttct tagtggtgt
241 gtctgtttt cttagcttt taatatcca ggtgcacaat ttgattgtct tacaatttc
301 ttgctcaaa gagataaaga ttctaattt ctctgtgac ccttctcaac tctcaccct
361 ttctgttct gacaccttg tcaatacat agtcacgaat ttcttgctg ctgtatttg
421 ttttctccc atctcaggga tcttttctc ttactataaa attgcccct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc ttagctctc acctggcagt
541 tgtttgctta tttatggaa cagtattgg agtgtacct gggtcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgtgta cacagtggc actccc (SEQ ID NO:129).

OR86

LOCUS AF127899 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO29) gene, partial cds.
ACCESSION AF127899

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

gene <1..>649

/gene="SBO29"

CDS <1..>649

/gene="SBO29"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD

IFMLTVMAYDRYVAICHPLHYTVTNPRCLGLLVLASWILSALNSSLQTLIVRLSFC

TDLEIPRFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGHYSYSKIVSSIRA

ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSGAAALVMYTVVTP" (SEQ ID

NO:130).

BASE COUNT 138 a 177 c 133 g 201 t

ORIGIN

1 cttgtgac atctgtttg tctctaccac tctccgaag atgctgtaa atatccagac
61 acacagcaaa gtcacacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccctg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc

241 atctctggatc ctgagtgcgc tgaattctc attacaacc ttaatatgtc tgcggcttcc
301 cttctgcaca gacttggaaa tccccgcctt ttctcgcaa cttaatcagg tcatacatct
361 tgcctgttat gacactttcc ttaatgatgt ggtgatgtat ttggcagcta tgcctgtcggg
421 cgggtgtccc ctacaggaa ttatttact ttacttaag atagtttctt ccatacgtgc
481 aatctcatca gctcaggggga agtacaagge gttttccacc tgtgatctc acatcttaat
541 tgtctcctta ttttaaggta cactctagg tgtgtacctt agttctgctg caactggcaa
601 ctacattca ggtgctgcag ccttggtgat gtacactgtg gtcaccccc (SEQ ID NO:131).

OR87

LOCUS AF127900 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO30) gene, partial cds.
ACCESSION AF127900
KEYWORDS .

SOURCE Bolivian squirrel monkey.

ORGANISM *Saimiri boliviensis*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

reduction of function in primates

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES	Location/Qualifiers
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source 1..649

/organism="Saimiri boliviensis"

<1..>649

/gene="SBC

<1..>649

/codon_start=2

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/translation="FVDICFVSTTVPKMLVNIQTHSKVITFADCITQIGHCLLFAALD
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TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA

BASE COUNT 141 a 179 c 130 g 199 t

ORIGIN

1 cttttagac atctgtttg tgtctaccac tgtccgaag atgctggtaa atatccagac

61 acacagcaaa gtcattacct ttgcagaactg catcaccag ataggccatt gcctactctt

181 tcacccctg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc

241 atcctggatc ctgagtgcc tgaattcctc attacaacc ttaatagtgc tgcggctttc

361 tgccgtgtat gacacttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg

481 aatctcatca gctcagggga agtacaaggc gttttccacc tgtgcatctc acatcttaat

541 tgtctcctta tttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gtacacagt gtcaccccc (SEQ ID NO:133).

OR88

LOCUS AF127901 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC31) gene, partial cds.
ACCESSION AF127901
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>649
/gene="SSC31"
CDS <1..>649
/gene="SSC31"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMHTVVTP" (SEQ ID
NO:134).
BASE COUNT 141 a 178 c 131 g 199 t
ORIGIN
1 cttttagac atctgttttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcacacact tgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggatg tggccatctg
181 tcaccccttg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
241 atctggatc ctgagtgcc tgaattctc attacaaacc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccaatt tttctcgaa cttaatcagg tcatacatct
361 tgcctgttat gacatttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgtggg
421 cgggtgtccc ctcacaggaa ttattactc ttaactaag atagtttct ccatacgtgc
481 aatctcatca gtcagggga agtacaaggc gtttccacc tgtgcatctc acatcttaat
541 tgtctcctta tttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gcacacagt gtcaccccc (SEQ ID NO:135).

OR89

LOCUS AF127902 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC32) gene, partial cds.
5 ACCESSION AF127902
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
20 Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
25 gene <1..>646
/gene="SSC32"
CDS <1..>646
/gene="SSC32"
/codon_start=2
30 /product="olfactory receptor"
/translation="LADIGFTSTTVPRIVNIQTHSRVIA YASCLTQVSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYYKIASSILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
35 NO:136).
BASE COUNT 135 a 166 c 123 g 222 t
ORIGIN
1 cttggtgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atcgagctg cctgacacag gtgtctttt caatctttt
40 121 tgcgtgatg gaagacacgc tcttggtgt gatggcctat gaccggttg ttgccatctg
181 tcacccctg cactaccag tcatcatgaa cccagcactc tgtggcttct tagtgttgt
241 gtctgtttt cttagcctt taatatcca ggtgcacaat ttgattgtct tacaatttc
301 ttgctcaaa gagataaaga ttctaattt cttctgtgac cttctcaac tcctcacct
361 ttctgttct gacaccttg tcaataacat agtcacgaat ttcttctg ctgtatttgg
45 421 ttttctccc atctcaggga tcttttctc ttactataaa attgcctcct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc ttagctctc acctggcagt
541 tgtttgcta tttatggaa cagttattgg agtgtacctt gggcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgtatga cacagtgtc actccc (SEQ ID NO:137).

OR90

LOCUS AF127903 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC33) gene, partial cds.
ACCESSION AF127903

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>649

/gene="SSC33"

CDS <1..>649

/gene="SSC33"

/codon_start=2

/product="olfactory receptor"

/translation="FSDLCFSSVTIPKLLQNMQSQDPSIPYAGCLTQMYFFLYFSDL

SFLLVAMAYDRYVAICLPLHYATIMSPMLSRSLVALSWVLTFHAMLHTLLMARLRFC

ADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPLLLIIGSYARIVFSILK

VPSSKGICKAVSTCGSHLSVVSIFYGTVIGLYLCPANNSTLKETVMAVMTVMAP" (SEQ ID

NO:138).

BASE COUNT 115 a 192 c 134 g 208 t

ORIGIN

1 cttctgtgac ctctgttct ctctgtgac cattccaaag ttgtacaga acatgcagag

61 ccaagacca tccatccct atcgggctg cctgaccag atgtactct tctgtattt

121 ttccgatcta gagagcttc tctgtggc catggcctat gaccgctacg tggccatctg

181 cctcccccta cattacgcca ccatcatgag ccccatgctg tctcgctccc tgggtggcgt

241 gtcctgggtg ctgaccacct tccatgcat gttgcacact ttactcatgg ccaggttgcg

301 ttttgtgca gacaatgta tctccactt tttctgtgat atgtctgctc tgctgaagct

361 ggctgctct gacactcgag ttaatgaatt ggtgatatt atcatgggag gcctcattct

421 tgtcatccca ctctactta tcatgggctc ctacgcacga attgtctct ccatcctcaa

481 ggtccctct tctaagggtg tctgcaaggc cgtctctact tgtggctccc acctctctgt

541 ggtgtcactg ttctatggga ctgtattgg tctctactta tgcccatcag ctaataatc

601 tactctaaag gagactgtca tgctgtgat gtacactgtg atggccccc (SEQ ID NO:139).

OR91

LOCUS AF127904 646 bp DNA PRI 28-FEB-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC34) gene, partial cds.

ACCESSION AF127904

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>646
/gene="SSC34"
CDS <1..>646
/gene="SSC34"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPRITVNIQTHSRVIA YASCLTQMSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYKYKIASSILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
NO:140).
BASE COUNT 136 a 167 c 122 g 221 t
ORIGIN
1 cttggctgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atgcgagctg cctgacacag atgtctttt caatctttt
121 tgcgtgtatg gaagacacgc tcttggtctg gatggcctat gaccggttg ttgccatctg
181 tcacccctg cactaccag tcatcatgaa cccacgactc tgtggcttct tagtgttgg
241 gtctgtttt cttagcctt taatatccca ggtgcacaat ttgattgtct tacaatttc
301 ttgctcaaa gagataaaga ttctaattt cttctgtgac ccttccaac tctcaccct
361 ttctgttct gacaccttg tcaataacat agtcacgaat ttcttgctg ctgtatttg
421 tttcttccc atctcaggga tcttttctc ttactataaa attgcctct ccatctgag
481 agttccatta tcaatggga agtataaagc cttctccacc ttagctctc acctggcagt
541 tgtttgctta tttatggaa cagtcatgg agtgtacct gggtcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgatga cacagtggc actccc (SEQ ID NO:141).

OR92

LOCUS AF127905 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis SBO64 pseudogene, partial sequence.
ACCESSION AF127905
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO64"
/pseudo
BASE COUNT 145 a 157 c 129 g 218 t
ORIGIN
1 ctttctgat tctgttatt ccaccaccgt tatacccaaa ctgctggaga acttggtgt
61 ggaagacaga agcatctcct tcacaggatg cgtcatgcaa ttctttttg ccagcatatt
121 tgtggtgaca gaaatattca tgctggcagt gatggcctat gacagatttg tgggtggtg
181 ttacctctg ctctacacag ttgcaatgac ccagaggctt ttcttttct tagtggtctac
241 atcatacttc aggggtgacag tctgttctt gacaattacc ttcttctcc tggaaattac
301 ctccagagga aataatatca ttaataactt tgtgtgtgag cctgctgcca ttgttctgt
361 gccatgcttt gaccctaca tgagccagga aatcatttcc atttctgcca catcattgat
421 aacaagcagc ctgatgatca ttctacctc ctaagatttc gttttatca atgtcatgat
481 gatgccttcc actgggggggc gcataaaagc atgcgcgacc tgttctccc agctgaccgc
541 cattatcatt ttccatggga ccactcttt ttctattgt gttcttaact ccaaaagttc
601 atggctcatg gtcaagggtg gctctatct ttacacatg gtcacccc (SEQ ID NO:142).

OR93

LOCUS AF127906 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO65) gene, partial cds.
ACCESSION AF127906
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO65"
CDS <1..>649
/gene="SBO65"

/codon_start=2
 /product="olfactory receptor"
 /translation="FVDICVTSTTIPKTLNTHSKVITYAGCVTQLYFSVLFGLD
 SLLLTVMAYDRFVAICHPLRYMVIMNPQLCGLLVLSWIMSALHSLTESLMALSLLFC
 5 TDLKILHFFCELNQIIHIACSDTCLNNLVMYLSAVLLGGGPLAGILYSYSKIASSIRA
 ISSAKGKYKAFSTCASHLSVVSFLFYCTGLGVYLSSAATHNSLSSTAASVMYTVVTP" (SEQ ID

NO:143).

BASE COUNT 141 a 180 c 130 g 198 t

ORIGIN

10 1 cttttagac atctgtgta cctccaccac gattccaaag acactatcaa acatccagac
 61 acacagcaaa gtcacacat atgcaggctg tgcaccag ttgtacttt ctgtactct
 121 tatagggttg gacagcttac tcctgacct gatggcctat gaccgattg tggccatctg
 181 tcacccctg cgctacatgg tcatcatgaa cctcagctc tgggactgc tggttctggt
 241 gtctggatc atgagtggcc tcctccactt ttctgtgaa ctaatcaga taatccacat
 15 301 ctttgtaca gactgaaaa tcctccactt ttctgtgaa ctaatcaga taatccacat
 361 tgcctgttct gacacctgac ttaataacct ggtgatgtat ttgtcagctg tgcgtctggg
 421 cgggtgtctc ctgctggga tcctgtactc ttacttaag atagcttct ctatagctgc
 481 aatctcatca gctaaggga agtacaaggc atttccacc tgtcatctc acctctcagt
 541 tgtctctta ttatttgta caggcctagg ggtgtacctg agttctgctg caaccacaa
 20 601 ctactctca agtacagcag cctcgggtgat gtacactgtg gtcaccccc (SEQ ID NO:144).

OR94

LOCUS AF127907 649 bp DNA PRI 28-FEB-2000
 25 DEFINITION Saimiri sciureus olfactory receptor (SSC69) gene, partial cds.

ACCESSION AF127907

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

30 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

40 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

45 gene <1..>649

/gene="SSC69"

CDS <1..>649

/gene="SSC69"

50 /codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD

IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQPLIVLRLSFC

TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIHYSYSKIVSSIRA

ISSAQGKYKAFSTCASHILIVSLFYGTLLGAYLSSAATGNSHSSAAALVMYTVVTP" (SEQ ID NO:145).

BASE COUNT 139 a 179 c 131 g 200 t

ORIGIN

5 1 cttttagac atctgtttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcacacct ttgcaggctg catcaccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggtatg tggccatctg
181 tcaccccctg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattctc attacaacc ttaatagtgc tgcggcttgc
10 301 ctctgcaca gactggaaa tccccactt tttctggaa cttaatcagg tcatacatct
361 tgctgttat gacacttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg
421 cgggtgtccc ctacaggaa ttattactc ttactctaag atagtttct ccatactgc
481 aatctcatca gtcagggga agtacaaggc gtttccacc tgtcatctc acatcttaac
541 tgtctccta tttatggta cactcctagg tgcgtacct agttctgctg caactggcaa
15 601 ctacattca agtctgcag cttgggtgat gtacactgtg gtcaccccc (SEQ ID NO:146).

OR95

LOCUS AF179716 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA133) gene, partial cds.

ACCESSION AF179716

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>487

/gene="PPA133"

CDS <1..>487

/gene="PPA133"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPLLILGSYARIVSSI

LKVPSSKGICKAFSTCGSHLSVVSIFYGTIIGLYFCPSANSSTLKETVMAMMYTVVTP

ML" (SEQ ID NO:147).

BASE COUNT 82 a 141 c 107 g 157 t

ORIGIN

1 tgtggccatc tgetccccc tgcactacac cgccatcatg agcccatgc tctgtctgc

61 cctgtggcg ctgtctggg tgcgaccac cttccatgcc atgttacaca ctttactcat
 121 ggccagggtg tgttttgg cagacaatgt gatcccccac ttttctgtg atatgtctgc
 181 tctgtgaag ctggcctgct ctgacactcg agtcaatgaa ttggtgatat ttatcatggg
 241 agggctgatt ctgtcatcc cattctact catcctggg tctatgcac ggattgtctc
 301 ctccatcctc aaggccctt cgtctaaggg tatctgcaag gcgttctcta ctgtggctc
 361 ccacctctct gtgtgtcac tgttctatgg gaccattatt ggtcttact tctgcccatc
 421 agctaatagt tctactctaa aggagactgt tatggctatg atgtacactg tggtagcccc
 481 catgctg (SEQ ID NO:148).

OR96

LOCUS AF179717 486 bp DNA PRI 31-DEC-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA134) gene, partial cds.
 ACCESSION AF179717

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>486

/gene="PPA134"

CDS <1..>486

/gene="PPA134"

/codon_start=2

/product="olfactory receptor"

/translation="VAICQPLHYSTLLSPWACMAMVGTSWLTGIITATTHAFLIFSLP

FPSRPIIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFLIVTSYIRILGAI

LAMASTQSRRKVFSTCSSHLLVVSLLFGTASITYIRPQAGSSVTTDRVLSVFYTVITP

ML" (SEQ ID NO:149).

BASE COUNT 85 a 181 c 97 g 123 t

ORIGIN

1 tttgccatc tgcagcctc tgcactact taccctcttg agcccatggg cctgcatggc
 61 catgttggcg acctctggc tcacaggcat catcacggcc accacccatg ccttctcat
 121 cttctctcta cttttccca gccgccaat catccacac tttctctgtg acatcctgcc
 181 agtactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
 241 tgtagtcttc attatgatcc cttctctct gattgtcacc tttacatcc gcatcctggg
 301 agccatccta gcgatggcct ccaccagag ccgccgcaag gtcttctcca cgtctctc
 361 ccatctctc gtgtctctc tctctttgg aacagccagc atcacctaca tccggccgca
 421 ggcaggctcc tctgtacca cagaccgct cctcagtgtg ttctacacgg tcatcacacc

481 catgct (SEQ ID NO:150).

OR97

5 LOCUS AF179718 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA135 pseudogene, partial sequence.
ACCESSION AF179718
KEYWORDS .
SOURCE baboon.
10 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA135"
30 /pseudo
BASE COUNT 112 a 140 c 89 g 146 t
ORIGIN
1 tgtggacatc tgaagtcctt tgccactacc agtcatcatg aacgaaagaa cacggggccaa
61 actggctgct gcttctggt tcccaggctt tctgtagct actgtgcaga ccacgtggct
35 121 cttcagcttt ccattctgtg gcaccaacaa ggtgaaccac ttctctgtg acagcccacc
181 tgtgctgaag ctggtctgtg tagacacagc actgtttgag atctacacca tcaactggaac
241 cattctggtg gtcatgatcc cctgcttgct gatcttgtgt tctacactc tcattgctgc
301 tgccatcctc aagatcccat cagctaaagg gaagcataaa gccttctcta cgtgaccc
361 acatctcctt gttgtctctc tttctatct atcattaaac ctcacatatt ttcagcctaa
40 421 atcaaataat tctcctgaaa gcaaaaagct gctatcattg ttctacactg ttgtgactcc
481 catgttg (SEQ ID NO:151).

OR98

45 LOCUS AF179719 482 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA136 pseudogene, partial sequence.
ACCESSION AF179719
KEYWORDS .
SOURCE baboon.
50 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 482)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 5 REFERENCE 2 (bases 1 to 482)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..482
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>482
 15 /gene="PPA136"
 /pseudo
 BASE COUNT 91 a 151 c 96 g 144 t
 ORIGIN
 1 tgtggccatc tgccaccccc tctactatgt cacagccatg agtctctggac tctgtatctt
 20 61 gctcctctgc ttgtgttggg ggctctctgt tctctatggt ctctctctca ctctctctct
 121 gaccagggtg acctctctgt ggactcaaga gatccactac ctctctctgt agatgtactgt
 181 cctgctgcag ctggcatgtt ccaacaccca catcattcac acagtgtctgg ttgctactgg
 241 ctgctttctt ctctgacccc ttagggttca cgactacatc ctatatacgt attgtcagaa
 301 ccatacttca gataccctca gcctctaaga aacacaaaac ctctctgcc tggcctcac
 25 361 atttgggtgt ggtctcctc tttatggga cacttggtat ggtatacctg cagcccctcc
 421 acactactc catgaaggac tcagtagcca cagtgatgta tgctgtggtg acacctatga
 481 tg (SEQ ID NO:152).

OR99

30 LOCUS AF179720 481 bp DNA PRI 31-DEC-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA137) gene, partial cds.
 ACCESSION AF179720
 KEYWORDS .
 35 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 40 REFERENCE 1 (bases 1 to 481)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 45 REFERENCE 2 (bases 1 to 481)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 50 FEATURES Location/Qualifiers
 source 1..481
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>481

/gene="PPA137"
 CDS <1..>481
 /gene="PPA137"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LAICQPLRYPVLMNGRLCTVLVAGAWVAGSIHGSIQATLTFRLP
 YCGPNQVDYFICDIPAVLRLACADTTVNELVTFVDIGVVAASCFMLILLSYANIVHAI
 LKIRTTDGRRRRAFSTCGSHLTVVTVYYVPCIFIYLRAGSKSPLDGAVAVFYTVVTPFL" (SEQ

ID NO:153).

BASE COUNT 89 a 139 c 116 g 137 t
 ORIGIN

1 cctggcaata tgtaacccc tgcgctaccc agtgctcatg aatgggaggt tatgcacagt
 61 cctgtggct ggagctggg tcgccggctc cattcatggg tctatccagg ccaccctgac
 121 ctccgccta ccctattgtg ggcccaatca ggtagattac ttatctgtg acatccctgc
 181 agtattgaga ctggcctgtg ctgacacaac tgtaaatgag ctgtgacct ttgtggacat
 241 cggagtatg gccgccagtt gcttcatgtt aattctactt tcctatgccac acatagtcca
 301 tgccatctg aagatacgca ccactgatgg gaggcgccgg gccttctcta cctgtgctc
 361 ccacctaact gtgtgcacag tctactatgt tcctgtatt ttactctacc ttagggctgg
 421 ctccaagagc ccctggatg gggcagtggc tgtgtttac actgtgtgca ctccattcct
 481 g (SEQ ID NO:154).

OR100

LOCUS AF179721 487 bp DNA PRI 31-DEC-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA138) gene, partial cds.

ACCESSION AF179721

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>487

/gene="PPA138"

CDS <1..>487

/gene="PPA138"

/codon_start=2

/product="olfactory receptor"

/translation="VAICKPLLYPVIMTNGLCIRLLVLSFVGGFLHALIHEGILFRLT

FCNSNIIHHFYCDIIPLLTISCTDPSINFLMLFILSGSIQVFTILTVLVSYAFVLFTI

LKKKSVKGIRKAFSTCGAHLFSVCLYYGPLLFMYVGPASPQADDQDMVECVFYTVIIP
FL" (SEQ ID NO:155).

BASE COUNT 117 a 106 c 74 g 190 t
ORIGIN

5 1 tgtagccata tgcaaacctt tactttatcc agtgattatg accaatggac tgtgcatccg
61 gctattagtc ttgtcatttg taggtggcct ccttcacgcc ttaattcatg aaggcatttt
121 attcagatta accttctgta attctaacaat aatacatcac ttttactgtg acattatccc
181 attgttaacg atttctctgta ctgacccttc tattaatttt ttaatgcttt ttattttgtc
241 tgggttcaata caggatttca ctattttgac tgttctgtgc tcttatgcat ttgtcctctt
10 301 tacaatctta aaaaaaaagt cagtcaaagg cataaggaaa gccttttcca cctgtggagc
361 ccattctctc tctgtctgtt tatactatgg cccctctctc ttcattgtatg tgggcctctg
421 atctccacaa gcagatgatc aagatatggt agagtgtgta ttttacctg tcatcattcc
481 ttctta (SEQ ID NO:156).

15 **OR101**

LOCUS AF179722 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA139) gene, partial cds.
ACCESSION AF179722

20 KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
25 Papio.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
30 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
35 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
40 gene <1..>487
/gene="PPA139"
CDS <1..>487
/gene="PPA139"
/codon_start=2
45 /product="olfactory receptor"
/translation="VAICNPLLYMVVVSRRRLCLLLVSLTYLYGFSTAIVVSPCIFSMS
YCSSNIINHIFYCDIAPLLALSCSDTYLPEAIVFISAATNLVFSMITVLVSFNVLSI
LRMHSSEGRKKAFFSTCASHMMAVTVFYGTMLFMYLQPQTNHSLDSDKMASVFYTLVIP
ML" (SEQ ID NO:157).

50 BASE COUNT 110 a 111 c 85 g 181 t
ORIGIN

1 tgtggccatt tgtaaccctc tgcctcatat ggtggtggtg tctcggcggc tctgcctcct
61 gctgtctccc ctcacatacc tctatggctt ttctacagct atttggttt caccttgat
121 attctctatg tcttattgct cttctaataa aatcaatcat ttttactgtg atattgcacc

181 tctgttagca ttacttgcgt ctgatactta ctaccaggaa gcaatagtct tcatactgc
241 agcaacaat ttggttttt ccatgattac agttctagta tcttattca atattgttt
301 gtccattcta aggatgcatt catcagaagg aaggaaaaaa gcctttcca cctgtgcttc
361 acatatgatg gcagtcacag tttctatgg gacaatgctg ttcatgtatt tgcagcccca
421 aaccaaccac tcactggata ctgataagat ggcttctgtg ttttacacat tgggtattcc
481 tatgctg (SEQ ID NO:158).

OR102

```

10 LOCUS AF179723 487 bp DNA PRI 31-DEC-2000
   DEFINITION Papio hamadryas olfactory receptor (PPA140) gene, partial cds.
   ACCESSION AF179723
   KEYWORDS .
   SOURCE baboon.
15 ORGANISM Papio hamadryas
      Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
      Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
      Papio.
   REFERENCE 1 (bases 1 to 487)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
   TITLE The olfactory receptor gene repertoire in primates and mouse:
      Evidence for reduction of function in primates
   JOURNAL Unpublished
   REFERENCE 2 (bases 1 to 487)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
   TITLE Direct Submission
   JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
      1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
   FEATURES Location/Qualifiers
30 source 1..487
      /organism="Papio hamadryas"
      /db_xref="taxon:9557"
      gene <1..>487
      /gene="PPA140"
35 CDS <1..>487
      /gene="PPA140"
      /codon_start=2
      /product="olfactory receptor"
      /translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
40 FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI
      LKVPSSKGICKAFSTCGSHLSVVSFLFYGTIIGLYFCPSANSSTLKETVMGMMYTVVTP
      ML" (SEQ ID NO:159).
      BASE COUNT 82 a 141 c 108 g 156 t
      ORIGIN
45 1 tgtggccatc tgettcccc tgcactacac cgccatcatg agcccatgc tctgtctgc
      61 cctggtggcg ctgtcctggg tgctgaccac ctccatgcc atgttacaca ctttactact
      121 ggccagggtg tgttttgcg cagacaatgt gatccccac ttttctgtg atatgtctgc
      181 tctgtcgaag ctggcctgct ctgacactcg agtcaatgaa ttggtgatat ttatcatggg
      241 agggctgatt cttgtcatcc cattctact catccttggg tcctatgcac ggattgtctc
50 301 ctccatcctc aaggtccctt cgtctaaggg tatctgaag gcgttctcta cttgtggctc
      361 ccacctctct gtggtgtcac tgttctatgg gaccattatt ggtctctact tctgcccac
      421 agctaatagt tctactctaa aggagactgt tatgggtatg atgtacactg tggtgacccc
      481 catgctg (SEQ ID NO:160).

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OR103

LOCUS AF179724 478 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA142) gene, partial cds.

ACCESSION AF179724

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..478

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>478

/gene="PPA142"

CDS <1..>478

/gene="PPA142"

/codon_start=2

/product="olfactory receptor"

/translation="VAICKPLNYATIMSQPMCGFLMGVAGILGFVHGGIQTFLIAQLP

FCGPNVIDHFMCDLVPLLELACTDTHTLGPLIAANSGLCFLIFSMLVASVVIILCSL

RTHISEGRHKALSSCTSHIFVVILFFVPCSYLYLRPLTSFPTDKAVTVFCTLFTPML"

(SEQ ID NO:161).

BASE COUNT 93 a 126 c 98 g 161 t

ORIGIN

1 tgtggccatc tgaagccct tgaactatgc aaccatcatg agtcaaccta tgtgtggatt

61 cctgatgggg gtggctggga ttctgggatt tgtgcatgga gggatccaga ctctgttcat

121 agcccagtta ccattctgtg gccccaatgt catcgaccac ttatgtgtg atttagtacc

181 tcttctagag ctggcctgca cagacactca cacctgggg cctctgatag ctgccaacag

241 tggatcattg ttttctctca tttttccat gctggttgc tctatgtca tcatcctgtg

301 ctcctaaagg actcatatct ctgaaggcg tcacaaagct ctgtctagtt gtacctctca

361 tatctttgtt gtcatttat tctttgtccc ttgttcatac ctgtatctaa gacctctaac

421 ctcctcccc actgacaaag ctgtgactgt gtttgcacc ctatttacac ctatgttg (SEQ ID NO:162).

OR104

LOCUS AF179725 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA143) gene, partial cds.

ACCESSION AF179725

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>487

/gene="PPA143"

CDS <1..>487

/gene="PPA143"

/codon_start=2

/product="olfactory receptor"

/translation="VAICKPLHYLNIMNRRVCTLLVFTSWLVSFLIIFPALMLLLQLD

YCRSNIMDHFTCDYFPLLQLACSDTKFLEVMGFSCAVFTLMLTLALIFLSYIYIIRTI

LRIPSASQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKGVAILNTSVAP

ML" (SEQ ID NO:163).

BASE COUNT 120 a 110 c 85 g 172 t

ORIGIN

1 tgtggccatc tgcaagcctc tgcattactt gaatatcatg aatcgaagag tctgcacact

61 gcttgttttt acttcttggc tggtttcatt cttatcata ttccagcac tcatgttgct

121 ctacagctt gattactgta ggtctaatat tatggacatc ttacctgtg attatttcc

181 cctgctgcaa ctgcttggc cagacacaaa attcctagag gtgatgggat ttctgtgctg

241 tgtgtttact ctaattgtga cttggcatt aatattctg tcctacatat acattatcag

301 aacaattttg agaattcctt ctgctagtca aaggacaaag gcctttcca catgttcttc

361 ccacatgatt gtcatttcca tctctatgg cagctgcatt ttatgtaca ttaaacctc

421 agcaaaagat agagtgtcct tgagcaaggg agtggcaata ctaaaccctc cagtagcccc

481 catgctg (SEQ ID NO:164).

OR105

LOCUS AF179726 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA144) gene, partial cds.

ACCESSION AF179726

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA144"
CDS <1..>487
/gene="PPA144"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPWACMAMVGTSWLTGIITATTHAFLIFSLP
FPSRPIIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI
LAMASTQSRKVFSTCSSHLLVSLFFGTASITYIRPQAGSSVTTDRVLSLFYTVITP
ML" (SEQ ID NO:165).
BASE COUNT 85 a 184 c 95 g 123 t
ORIGIN
1 tgttgccatc tgccagcctc tgcactactc taccctcttg agcccatggg cctgcatggc
61 catggtgggc acctctggc tcacaggcat catcacggcc accacccatg ccttctcat
121 cttctctcta cttttcca cccgccaat catccacac tttctgtg acatcctgcc
181 agtactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
241 tgtagtcttc attatgatcc ctttctct gattgtcacc tttacatcc gcatcctggg
301 agccatccta gcgatggcct ccacccagag ccgccgcaag gtcttctcca cctgctctc
361 ccactctctc gtggtctctc tcttcttg aacagccagc atcacctaca tccggccgca
421 ggcaggctcc tctgttacca cagaccgct cctcagtctc ttctacacgg tcatcacacc
481 catgctc (SEQ ID NO:166).

OR106

LOCUS AF179727 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR183) gene, partial cds.
ACCESSION AF179727
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487

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/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene      <1..>487
          /gene="PTR183"
CDS       <1..>487
          /gene="PTR183"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAICFPLHYTAIMSPMLCLSVVTLSWVLTTFHAMLHTLLMARLC
          FCADNVIPHFCDMSALLKLACSDTRVNEWVFIMGGLIVVIPFLILGSYARIVSSI
          LKVPSSKGICKALSTCGSHLSVVSIFYGTVIGLYLCPANSSTLKDTVMAMMYTVVTP
          ML" (SEQ ID NO:167).

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BASE COUNT	86 a	137 c	105 g	159 t
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ORIGIN

1 tgtggccatc tgtttccccc tgcactacac cgcccatcatg agccccatgc tctgtctctc
61 cgtgggtgacg ctgtcctggg tctgaccac cttccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaaatg gatccccac ttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt gttgtcatcc cattctact catcctggg tctatgcaa gaattgtctc
301 ctccatcctc aaggctccctt ctctaagggt tatctgcaag gccttgtcta cttgtggctc
361 ccacctgtct gtgggtgcac tgtttctatgg gaccgtatt ggtctctact tatgccatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:168).

OR107

LOCUS AF179728 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR203) gene, partial cds.
ACCESSION AF179728
KEYWORDS .
SOURCE chimpanzee.

ORGANISM *Pan troglodytes*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES	Location/Qualifiers
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source 1..487

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/db xref="taxon:9598"
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gene <1..>487

/gene="PTR203"

CDS <1..>487

/gene="PTR203"

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/codon start=2
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/product="olfactory receptor"
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/translation="VAICFPLHYTAIMSPMLCLSVVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNEWVIFIMGGLIVVIPFLLILGSYARIVSSI
LKVPSSKGICKALSTCGSHLSVVSIFYGTVIGLYLCPANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:169).

BASE COUNT 85 a 137 c 106 g 159 t
ORIGIN

1 tgtggccatc tgtttcccc tgcaactacac cgccatcatg agcccatgc tctgtctctc
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121 ggccagggtg tgttttggc cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt gttgtcatcc cttctactat catcctggg tcctatgcaa gaattgtctc
301 ctccatctc aaggtccctt ctttaaggg tatctgcaag gcctgtcta ctgtggctc
361 ccactgtct gtggtgtcac tgttctatgg gaccgttatt ggtctctact tatgccatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:170).

OR108

LOCUS AF179729 485 bp DNA PRI 31-DEC-2000

DEFINITION Pan troglodytes PTR204 pseudogene, partial sequence.

ACCESSION AF179729

KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>485
/gene="PTR204"
/pseudo

BASE COUNT 130 a 107 c 77 g 171 t

ORIGIN

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61 gttgctaagc atttcatatg taattgggtt cctgcatcct ctggttcacg tgagtttact
121 attgcgacta actttctgca ggttaacat aatacattat ttctactgtg aaattttaca
181 actgttcaaa atttcatgca atgttccatc tattaacgca ctaatgatat ttattttgg
241 tgttttata caaataccca cttaaatgac gatcataatc tcttatactc gtgtgctctt
301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcagcgc
361 ccatctgctt tctgtctcat tgtactacgg aactctgac ttcatgtatg tgcgtcctgc
421 atctggctta gctgaagacc cagacaaaagt gtattctctt ttacacgatt ataattcccc
481 tgcta (SEQ ID NO:171).

OR109

LOCUS AF179730 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR205) gene, partial cds.
ACCESSION AF179730
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR205"
CDS <1..>487
/gene="PTR205"
/codon_start=2
/product="olfactory receptor"
/translation="VAICRPLCYSTVTRPQVCALMLALCWVLTNIIALHTFLMARLS
FCVTGEIAHFCDITPVLKLSCSDTHINEMMVFLVGGTVLIVPFLCIVTSYIHIVPAI
LRVTRGGVGKAFSTCSSHLCVVCVFYGTLFSAYLCPPSIASEEKDIAAAAMYTIVTP
ML" (SEQ ID NO:172).
BASE COUNT 83 a 148 c 110 g 146 t
ORIGIN

1 tgtggccatt tgccgcccc tctgtactc cacagtcacg aggccccaag tctgtgccct
61 aatgcttgca ttgtctggg tcctcacaa tatcattgcc ctgactcaca cgttcctcat
121 ggctcggttg tcctctgtg tgactgggga aatgctcac ttttctgtg acatcactcc
181 tgtcctgaag ctgtcatgtt ctgacacca catcaacgag atgatggttt ttgtcttggg
241 aggcaccgta ctcacgtcc ccttttatg cattgtcacc tcctacatcc acattgtgcc
301 agctatcctg aggggtccgaa cccgtggtgg ggtgggcaag gcctttcca cctgcagttc
361 ccacctctgc gttgtttgtg tgtctatgg gacgctcttc agtgctacc tgtgtcctcc
421 ctccattgcc tctgaagaga aggacattgc agcagctgca atgtacacca tagtgactcc
481 catgttg (SEQ ID NO:173).

OR110

LOCUS AF179731 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR206) gene, partial cds.
ACCESSION AF179731
KEYWORDS .
SOURCE chimpanzee.

ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR206"
CDS <1..>487
/gene="PTR206"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYSTIMALRLCASLVAAPWVIAILNPLLHTLMM AHLH
FCSDNVIHHFFCDINSLPLSCSNTSLNQLSVLATVGLIFVVPVCILVSYILIVSAV
MKVPSAQGKLKAFSICGSHLALVILFYGAITGVYMSPLSNHSTEKDSAASVIFMVVAP
VL" (SEQ ID NO:174).

BASE COUNT 90 a 138 c 91 g 168 t

ORIGIN
1 cgtggccatc tgcaccctt tacattactc caccattatg gccctgcgcc tctgtgcctc
61 tctggtagct gcacctggg tcattgcat ttgaacct ctctgcaca ctctatgat
121 ggcccatctg cactctgct ctgataatgt tatccaccat ttctctgtg atatcaactc
181 tctctccct ctgtctgtt ccaacaccag tctaatcag ttgagtgtc tggctacggt
241 ggggctgac ttgtgtgtac ctgcagtgtg tctctggtg tctatatacc tcatgtttc
301 tgcgtgatg aaagtcctt ctgcccaagg aaaactcaag gctttctcta tctgtggatc
361 tcacctgcc ttggtcattc tttctatgg agcaatcaca ggggtctata tgagccctt
421 atccaatcac tctactgaaa aagactcagc cgcacagtc attttatgg ttgtagcacc
481 tgtgttg (SEQ ID NO:175).

OR111

LOCUS AF179732 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR207) gene, partial cds.
ACCESSION AF179732
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR207"
CDS <1..>487
/gene="PTR207"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCNPLLYTVAMYQRLCSLLVATSICWGRVCSLTLTYFLLLELS
FRGNNIINNPFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLVITLTSYAFIFITV
MKTASIGGRKKAFFTCASHLTAITIFHGTLFLYCVPNSSKSSWLMVKVASVFYTVVIP
ML" (SEQ ID NO:176).
BASE COUNT 99 a 122 c 103 g 163 t
ORIGIN
1 tgtggcgggtg tgtaaccctc ttctctacac agttgcaatg taccagaggc ttgtctcctt
61 gttgggtgctt acatcatact gttggggggag agtctgttcc ctgacactta cctactttct
121 actggaatta tccttcagag gaaataatat cattaataac ttgtctgtg agcatgctgc
181 cattgttgc tgtcttgc ctgaccctta tgtgagccag gagatcactt tagtttctgc
241 cacattcaat gaaataagca gcttggtgat cactctcact tcctatgctt tcatttttat
301 cactgtcatg aagacggcct ccattggggg gcgcaagaaa gcgttctca cgtgtgcctc
361 ccacttgacg gccattacca tttccatgg gactattctt ttctctact gtgttcctaa
421 ctccaaaagt tctggctca tggtaaggt ggcctctgtc ttttacacag tggctattcc
481 catgctgc (SEQ ID NO:177).

OR112

LOCUS AF179733 481 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR208) gene, partial cds.
ACCESSION AF179733
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

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REFERENCE 1 (bases 1 to 481)
AUTHORS  Giorgi,D.G. and Rouquier,S.P.
TITLE    The olfactory receptor gene repertoire in primates and mouse:
          Evidence for reduction of function in primates
JOURNAL  Unpublished
REFERENCE 2 (bases 1 to 481)
AUTHORS  Giorgi,D.G. and Rouquier,S.P.
TITLE    Direct Submission
JOURNAL  Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
          1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES             Location/Qualifiers
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99

09747155.132100

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CDS       <1..>481
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          /product="olfactory receptor"
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YCGPNQVDYFICDIPAVLRLACADTTVNELVTFVDVGVAASCFMLILLSYANIVNAI
LKIRTTDGRHRAFASTCGSHLIVTVYYVPCIFIYLRAGSKGPLDGAAVFYTVVTPLL"
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(SEQ ID NO:178).

BASE COUNT 85 a 141 c 124 g 131 t
ORIGIN

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1 cctggcaata tgtcagcccc tgcgctaccc agtgctcatg aatgggaggt tatgcacagt
61 ccttggtgct ggagcttggt tgcgcggtc catgcatggg tctatccagg ccaccctgac
121 ctccgcctg ccctactgtg ggcccaatca ggtggattac ttatctgtg acatccccgc
181 agtattgaga ctggcctgtg ctgacacaac tgtcaatgag ctgtgacct ttgtggacgt
241 cggggtggtg gccgccagt gcttcatgtt aattctgtc tcgtatgcca acatagtaaa
301 tgccatctg aagatacgca cactgatgg gaggcaccgg gccttccca cctgtggctc
361 ccactaatc gtggtcacag tctactatgt cccctgtatt tcatctacc ttagggctgg
421 ctccaaaggc cccctggatg gggcggcggc tgtgtttac actgtgtca ctccattact
481 g (SEQ ID NO:179).
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OR113

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LOCUS  AF179734 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR209) gene, partial cds.
ACCESSION AF179734
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
          Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
          Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
       Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
       1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES             Location/Qualifiers
    source             1..487
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                       /db_xref="taxon:9598"
    gene               <1..>487
                       /gene="PTR209"
    CDS                <1..>487
                       /gene="PTR209"
                       /codon_start=2
                       /product="olfactory receptor"
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FCTSWVIQHFYCELAQVLTLTCS DTHVNYILLYVVTGLLD FVPFSGILFSYTQIVSYI

LRISSTDGKHKAFSTCGSHLFVVSLFYGTGLGVYLSSNASSSSWWGMVASVMYTVVTP

ML" (SEQ ID NO:180).

5 BASE COUNT 79 a 144 c 107 g 157 t

ORIGIN

1 cgtggccatc tgtcaccccc tgtactaccg tgcacatcgtg aacccccgcc tctgtggcct
61 gctgggtctt gtgtcctggt tctcagctt gtcatactcc ctgatccaga gtctgttgat
121 gctgcagggt tcttctgta ccagtgggt cattcagcac ttctactgtg agcttgctca
10 181 ggctctcagc cttacctgt cagacacaca cgtaattac atcctgctgt acgtggtgac
241 tggcctctg gactttgtgc cttctcagg gatccttttc tctacaccc aaattgtctc
301 ctacatccta agaattcat ccacagatgg gaaacacaaa gcctttcta cctgtggatc
361 tcactgttt gtgggtttt tattctatgg gacaggcctt ggtgtgtatc ttattccaa
421 tgcacgtgcc tcttctggtt ggggcatggt ggcctcggtc atgtacactg tggtcacccc
15 481 catgctg (SEQ ID NO:181).

OR114

LOCUS AF179735 487 bp DNA PRI 31-DEC-2000

20 DEFINITION Pan troglodytes olfactory receptor (PTR210) gene, partial cds.

ACCESSION AF179735

KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

40 /organism="Pan troglodytes"

/db_xref="taxon:9598"

gene <1..>487

/gene="PTR210"

CDS <1..>487

45 /gene="PTR210"

/codon_start=2

/product="olfactory receptor"

/translation="VAICNPLLYPVMMSNKL SAQLLSISYVIGFLHPLVHVSLLLRLT

FCRFNIIHYFYCEILQLFKISCNGPSINALMIFIGAFIQIPTLMTIIISYRVLFDI

LKKKSEKGRSKAFSTCSAHL LSVSLYYGTLIFMYVRPASGLAEDPDKVYSLFYTIIP

50 LL" (SEQ ID NO:182).

BASE COUNT 129 a 107 c 78 g 173 t

ORIGIN

1 ttagccata tgaatccct tgccttatcc agtcatgatg tccaacaaac tcagcgctca

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121 attgcgacta actttctgca ggttaacat aatacattat ttctactgtg aaattttaca
 181 actgttcaaa atttcatgca atggtccatc tattaacgca ctaatgatat ttatttttgg
 241 tgcttttata caaataccca cttaaatgac gatcataatc tcttattctc gtgtgctctt
 301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcagcgc
 361 ccatctgctt tctgtctcat tgtactacgg aactctgac ttcattgatg tgcgtcctgc
 421 atctggctta gctgaagacc cagacaaagt gtattctctg ttttacacga ttataattcc
 481 cctgcta (SEQ ID NO:183).

OR115

LOCUS AF179736 487 bp DNA PRI 31-DEC-2000
 DEFINITION Pan troglodytes olfactory receptor (PTR211) gene, partial cds.
 ACCESSION AF179736
 KEYWORDS .
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
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 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>487
 /gene="PTR211"
 CDS <1..>487
 /gene="PTR211"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLRYTVLMNIHFCGLLILLSRFMSTMDALVQSLMIFQLS
 FCKNVEIPLFFCEVVQVIKLACSDTLINNILIYFASSIFGAIPLSGIIFSYSQIVTSV
 LRMP SARGKYKAFSTCGCHLSVFSLFYGTAFGVSISSAVAESSRITAVGSVMYTVVPQ
 MM" (SEQ ID NO:184).
 BASE COUNT 102 a 120 c 98 g 167 t
 ORIGIN
 1 tgtggccatt tgccaccac tgaggtaac agtctcatg aacatccatt tctgcggctt
 61 gctgattctt ctctccaggt tcatgagcac tatggatgcc ctggtcaga gtctgatgat
 121 atttcagctg tcttctgca aaaacgttga aatcccttgg ttcttctgtg aagtcgttca
 181 ggatcatcaag ctgcctgtt ctgacaccct catcaacaac atcctcatat atttgcgaag
 241 tagcatattt ggtgcaattc ctctctctgg aataatttc tcttattctc aaatagtcac
 301 ctctgttctg agaatgccat cagcaagagg aaagtataaa gcgttttcca cctgtggcgtg
 361 tcacctctct gtttttctt tgttctatgg gacagctttt ggggtgtcca ttagttctgc
 421 tgttgctgag tcttcccga ttactgctgt ggggtcagtg atgtacactg tgggtcccaca
 481 aatgatg (SEQ ID NO:185).

OR116

LOCUS AF179737 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR212) gene, partial cds.
ACCESSION AF179737
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR212"
CDS <1..>487
/gene="PTR212"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLLYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:186).
BASE COUNT 87 a 141 c 105 g 154 t
ORIGIN
1 tgttgccata tgtcacctc tccactacac tgtcatcatg aggggaagagc tctgtgtctt
61 cttagtggct gtatcttga ttctgtcttg tgccagctcc ctcttcaca ccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catcccccatt gtcttctgtg accttctgctc
181 cctgtcctgct ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtgctc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg aggggtccct caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctct gtggtgtctc tctattatgg gtcaatattt ggccagtacc tttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacacc
481 catgttg (SEQ ID NO:187).

OR117

LOCUS AF179738 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar HLA121 pseudogene, partial sequence.
ACCESSION AF179738
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..484
15 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA121"
/pseudo

20 BASE COUNT 88 a 145 c 118 g 133 t
ORIGIN
1 tgtgctatc tgcctgccgc ttaggtatcc agagctcatg agtgggcaga cctgcattgca
61 gatggcagca ctgagctggg ggacaggcct tgccaactca ctgctacagt ccattcctgt
25 121 ctggcgccct cctttctgtg gccacaacgt catcaaccac tttttctgtg agattctggc
181 agtgctaaaa ctggcctgtg gggacatctc cctcaatgcg ctggcattaa tggtgggccac
241 agctgtctctg acactggccc ccctctgtct catctgcctg tcttacctt tcattctgtc
301 tgccatcctt agggtagcct ctgctgcagg cggcgcaaaa gccttctcca cctgtctcagc
361 ccacctcaca gtgggtgtgg tttttaagg gacaatttcc tcatgtact tcaaaccctaa
421 ggccaaggac cccaacgtgg ataagattgt tgcattgttg tatggggttg tgaccacctc
30 481 gctg (SEQ ID NO:188).

OR118

35 LOCUS AF179739 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA122) gene, partial cds.
ACCESSION AF179739
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"

094456 42400
0022T 94760

FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIIGLYFLPPSSNTNDKNIIASVIYTVVTP
M" (SEQ ID NO:191).

BASE COUNT 95 a 144 c 93 g 154 t

ORIGIN

1 tgtggccatc tgtcacccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgggtgct gggctcctggg tcacgcttg tgcgtgtgct ctttgcata ccctcctcct
121 ggcccagctt tccttttgg ctgaccacat catccctcac ttctctgtg accttggtgc
181 cctgctcaag ttgctctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgcttc cattctgtg catcctggtt tcttatggtc acattggggt
301 caccatctc cagattccct ctaccaaggg catatgcaaa gcctgtcca cttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgtt (SEQ ID NO:192).

OR120

LOCUS AF179741 487 bp DNA PRI 31-DEC-2000

DEFINITION Hylobates lar olfactory receptor (HLA124) gene, partial cds.

ACCESSION AF179741

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Hylobates lar"

/db_xref="taxon:9580"

gene <1..>487

/gene="HLA124"

CDS <1..>487

/gene="HLA124"

/codon_start=2

/product="olfactory receptor"

/translation="VAICSPLHYPVIMNQRTRAKLAAASWFGFPVATVQTTWLFSFP

FCGTNKVNHFFCDSPVLRVLCADTALFEIYAIVGTILVVMIPCLLILCSYTHIAAAI

LKIPSAKGKNKAFSTCSSHLLVVSIFYISLSLTYFRPKSNNSPEGKLLSLSYTVVTP

ML" (SEQ ID NO:193).

BASE COUNT 102 a 141 c 96 g 148 t

ORIGIN

1 tgtggccatc tgtatccct tgcactaccc agtcacatg aaccaaagga ctctgtccaa
61 actggctgct gcctcctggt tcccagctt tctgtagct actgtgcaga ccacatggct
121 cttcagtttt ccattctgtg gcaccaacaa ggtaaaccac ttctctgtg acagcccgcc

5 181 tgtgctgagg ctggtctgtg cagacacagc actgtttgag atctacgcca tgcgcggaac
 241 cattctgggtg gtcgatgcc ctgcttgcct gatcttgtgt tctatactc acattgctgc
 301 tgccatcctc aagatcccat cggctaaagg gaagaataaa gccttctcta cgtgttcctc
 361 acacctcctt gttgtctctc ttctctatat atcattaagc ctcacatatt ttgcgcctaa
 421 atcaataat tctcctgagg gcaagaagct gctatcattg tctacactg ttgtgactcc
 481 catgttg (SEQ ID NO:194).

OR121

10 LOCUS AF179742 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA125) gene, partial cds.
 ACCESSION AF179742
 KEYWORDS .
 SOURCE common gibbon.
 15 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 30 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>487
 /gene="HLA125"
 35 CDS <1..>487
 /gene="HLA125"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYLNIMNRRVCILLVFTSWLISFLIIFPALMLLLKLD
 YCRSNIIDHFTCDYFLLQLACSDTKFLEVMAFSCAVFTLMFTLALISLSYIYIIRTI
 40 LRIPSTSQRTKAFSTCSSHMVVISISYGSCIFMYIKPSAKDRVSLSKGVAILNTSVAP
 MM" (SEQ ID NO:195).
 BASE COUNT 121 a 107 c 82 g 177 t
 ORIGIN
 45 1 tgtggccatc tgcaagcctc tgcattactt gaatatcatg aatcgaagag tctgcatact
 61 gctgttttt acttcttggc tgatttcatt cttaatcata ttccctgcac tcatgttgct
 121 cttaaagctt gattactgta ggtctaatat tattgacatc ttacctgtg attatttcc
 181 cctgctgcaa ctgcttggc cagacacaaa attcttagag gtgatggcat ttcttgtgc
 241 tgtgtttact ctaatgttca ctttggcatt aatatctctg tctacatat acattatcag
 301 aacaatttg agaattcctt ctactagtca gaggacaaag gcctttcca catgttcttc
 50 361 ccacatgggt gtattttcca tctcttatgg cagctgcatt ttatgtaca ttaaaccctc
 421 agcaaaagat agagtgtcct tgagcaaggg agtggcaata ctaaaccctc cagtagcccc
 481 catgatg (SEQ ID NO:196).

001221 99124260

OR122

LOCUS AF179743 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA126) gene, partial cds.
ACCESSION AF179743
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA126"
CDS <1..>484
/gene="HLA126"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAISWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMFCILVSYGYIGATI
LRVPSTKGIHKASTCGSHLSVVSLYYGSIFGQYLFPTASSIDKDVIVAVMYTVITPM
L" (SEQ ID NO:197).
BASE COUNT 88 a 143 c 104 g 149 t
ORIGIN
1 tgttgccata tgtcaccctc tccactacac tgtcatcatg aggggaagagc tctgtgtctt
61 cttagtggtc atacttgga ttctgtcttg tgccagctcc ctcttcaca ccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catccccac gtcttctgtg acctgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg aggggtccctt caaccaaagg gatccacaaa gcgtccacgt gtggctccca
361 tctttctgtg gtgtctctct attatgggtc aatatttggc cagtaccttt tcccgaccgc
421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:198).

OR123

LOCUS AF179744 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA127) gene, partial cds.
ACCESSION AF179744
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar

097475.43400 "622" 4260

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
15 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA127"
CDS <1..>487
20 /gene="HLA127"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVM LVAGSWVIACACALLHTLLLAQLS
FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
25 LQIPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:199).
BASE COUNT 95 a 143 c 94 g 155 t
ORIGIN
1 tgtggccatc tgcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
30 61 gctgggtggc gggctcctggg tcacgccttg tgcgtgtgct cttttgcata cctctcctc
121 ggcccagctt tcctttgtg ctgaccacat catccctcac ttcttctgtg acctgggtgc
181 cctgctcaag ttgctctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgctc cattcttgtg catcctgggt tcttatggtc acattggggt
301 caccatcctc cagattcctc ctaccaaggg catatgcaaa gccttgcca ttgtggatc
35 361 ccacctctca gtgggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:200).

OR124
40
LOCUS AF179745 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA128) gene, partial cds.
ACCESSION AF179745
KEYWORDS .
45 SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..484
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>484
 /gene="HLA128"
 CDS <1..>484
 /gene="HLA128"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTVIMREELCVFLVAVSWILSCASSLSHTLLLTRL
 FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMFCILVSYGYIGATI
 LRVPSTKGIHKASTCGSHLSVVSLLYYGSIFGQYLFPTASSIDKDVIVAVMYTVITPM
 L" (SEQ ID NO:201).

BASE COUNT 87 a 143 c 105 g 149 t
 ORIGIN

1 tgttgccata tgtcacctc tccactac tgatcatg agggagagc tctgtgtt
 61 cttagtggt gtatttga ttctgttg tgccagctc ctcttcaca cccttctc
 121 gaccggctg tctttctg ctgcgaac catccccac gtcttctg acctgtctg
 181 cctgctcaag ctgtctgt cagatatct cctcaatg ctggtcatg tcacagtagg
 241 ggtggtggtg attacctgc cattcatg tctctgga tcatatggc acattggggc
 301 caccatcctg agggctcct caacaaagg gatccacaa gcgtccacgt gtggtccca
 361 tcttctgtg gtgtctctc attatgggc aatattggc cagtacctt tccgaccgc
 421 aagcagttc attgacaagg atgtcattg ggctgtcatg tacacagta tcacacccat
 481 gttg (SEQ ID NO:202).

OR125

LOCUS AF179746 484 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA129) gene, partial cds.
 ACCESSION AF179746
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 484)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 484)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..484
 /organism="Hylobates lar"
 /db_xref="taxon:9580"

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gene      <1..>484
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CDS       <1..>484
          /gene="HLA129"
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          /product="olfactory receptor"
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          LRV PSTKG IHKASTCGSHLSV VSLYYGSIFGQYLFPTASSIDKDVIVAVMYTVITPM
          I." (SEQ ID NO:203).

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BASE COUNT	85 a	139 c	111 g	149 t
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ORIGIN

1 tgtggccatc tgtcacccct tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgtgtggt gggctcctggg tcatcgcttg tgcgtgtgct cttttgcata cctctcctc
121 ggcccagctt tctttttgtg ctgaccacat catccctcac ttctctgtg accttgggtc
181 cctgtctcaag ttgtctgtct cagatacctt cctcaatgag ctggtcatgt tcacagttagg
241 ggtgggtggc attaccctgc cattcatgtg tctcctggta tcatatggct acattggggc
301 caccatcctg aggggtccct caaccaaagg gatcacaaa gcgctccagt gtggctccca
361 ttcttctgtg gtgtctctct attatgggtc aatatttggc cagtacctt tcccgaccgc
421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gtgc (SEQ ID NO:204).

OR126

LOCUS AF179747 486 bp DNA PRI 31-DEC-2000

DEFINITION Hylobates lar HLA130 pseudogene, partial sequence.

004427 " 5974260

181 ctgctcaagt tgtctgctc agatactcc ctcaatcagt tggcaatctt tacagcagga
241 ttgacagcca ttatgcttcc attctgtgc atcttggtt ctatggta cattggggtc
301 accatctcc agattccctc taccaagggc atatgcaaag ccttgccat ttgtggatcc
361 cactctcag tggtgactat ctattatggg acaattattg gtctctattt tcttcccca
421 tccagcaaca ccaatgacaa gaacataatt gcttcagtga tatacacagt agtcactccc
481 atgttg (SEQ ID NO:205).

OR127

10 LOCUS AF179748 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA131) gene, partial cds.
ACCESSION AF179748
KEYWORDS .
15 SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
20 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
25 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
30 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA131"
CDS <1..>487
35 /gene="HLA131"
/codon_start=2
/product="olfactory receptor"
/translation="VAICRPLYYPVIMKPHLCGLLVLSWFLSLSYSLLMLRVS
FCTSWVIQHFYCELAQVLTACSDTHINYILLYMVTGLLGFVPFSGILFSYTQIVSSI
40 LRISSPDGKHKAFSTCGSHLSVVSFLFYGTGLGVYLSSNASSSSWRGMVASVMYTVVTP
NV" (SEQ ID NO:206).
BASE COUNT 80 a 145 c 106 g 156 t
ORIGIN
45 1 tgtggccatc tgtgcccc tgtactacc tgtcatcatg aaacctcacc tctgtggcct
61 gctggttctt gtgtctctgt tctcagctt gtcatactcc ctgatccaga gtctgttgat
121 gctgcggttg tcttctgca ccagttgggt cattcagcac ttctactgtg agcttgctca
181 ggtctcagc ctgctctgt cagacacaca catcaattac atctgtctct acatgggtgac
241 cggccttttg ggctttgtgc cttctcagg gatcctttt tctacaccc aaatcgtctc
50 301 ctccatctg agaatctcat cccagatgg gaaacacaaa gccttttcta cctgtggatc
361 tcactgtct gtggtttctt tattctatgg gacaggtctt ggcgtgtatc ttagtccaa
421 tgcatcgtcc tcttctggc ggggcatggt ggcttcggtg atgtacactg tggtaacccc
481 caatgtg (SEQ ID NO:207).

OR128

LOCUS AF179749 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA132) gene, partial cds.
 5 ACCESSION AF179749
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 10 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 15 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 25 gene <1..>487
 /gene="HLA132"
 CDS <1..>487
 /gene="HLA132"
 /codon_start=2
 30 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS
 FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQTPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 ML" (SEQ ID NO:208).
 35 BASE COUNT 95 a 144 c 94 g 154 t
 ORIGIN
 1 tgtggccatc tgcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
 61 gctggtgct gggctctggg tcatcgcttg tgcgtgtgct cttttgcata cctctcctc
 121 ggcccagctt tcctttgtg ctgaccacat catccctcac ttctctgtg accttggtgc
 40 181 cctgctcaag ttgtctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
 241 attgacagcc attatgcttc cattctgtg catcctggtt tcttatggc acattggggt
 301 caccatcctc cagactccct ctaccaaggg catatgcaaa gccttgcca ttgtggatc
 361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
 421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
 45 481 catgttg (SEQ ID NO:209).

OR129

LOCUS AF179750 487 bp DNA PRI 31-DEC-2000
 50 DEFINITION Gorilla gorilla olfactory receptor (GGO100) gene, partial cds.
 ACCESSION AF179750
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO100"
CDS <1..>487
/gene="GGO100"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTFIMDQNTCIQLAVISWSSSFLCSMVINVLTLSP
YCGPNILNHFFCEVPTVLRSLCTDTSFTLVVFIFSIIVFIPFLIVVSYVRILQSV
LRMRSASGRYKALSTCTSHLTVVTLFYGTAILMYMRPQSRSSWAGGKIIAVFYTVVTP
ML" (SEQ ID NO:210).

BASE COUNT 91 a 130 c 97 g 169 t

ORIGIN
1 ttagccatt tgcacctc ttcatatc cttcattatg gaccaaaca cctgcattca
61 actggcagtt atttcttggt ccagtagctt cctgtgtcc atggttatca atgttctcac
121 gttgagtttg ccctactgtg ggcctaatat cctgaatcac ttttctgtg aggtacctac
181 tgcctgagg ttgtcttgca ccgacacctc atcacggag ctggtgttt ttatcttcag
241 tatcatcatt gtctcatcc ctttctctct cattgttgtt tctatgtcc ggatccttca
301 atctgttctc aggatgcggt cagcctccgg gcggtataag gcattatcca cctgtacctc
361 ccatttgaca gtggaacct tattttatgg gactgccatc ctcattgaca tgagaccaca
421 gtcgaggtct tctgggctg gcggcaagat cattgcggtt ttctacacgg tggtcacacc
481 catgctt (SEQ ID NO:211).

OR130

LOCUS AF179751 488 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO101 pseudogene, partial sequence.
ACCESSION AF179751
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>488
 /gene="GGO101"
 /pseudo

BASE COUNT 91 a 144 c 113 g 140 t

ORIGIN

1 tgtggccatt agccaccac ttactatcc catcctcatg aatcagaggg tctgtctcca
 61 gattaccggg agctcctggg cctttgggat aatcgatggc ttgatccag atggtggtag
 121 taatgaattt ccctactgt ggcttgagga aggtgaacca ttcttctgt gagatgctat
 181 cctgttgaa gctggcctgt gtagacacat ccctgttga gaagtgata ttgcttgct
 241 gtgtcttcat gcttctctt ccattctcca tcatcgtggc ctctatgct cgcattctag
 301 ggactgtgct gcaaatgcac tctgtcagg cctggaaaaa ggccctggcc acctgctcct
 361 cccacctgac agctgtcacc ctcttctatg gggcagccat gtcatctac ctgaggccta
 421 ggcgctaccg ggcccccagc catgacaagg tggcctctat ctctacaca gtccttactc
 481 ccatgctg (SEQ ID NO:212).

OR131

LOCUS AF179752 487 bp DNA PRI 31-DEC-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO102) gene, partial cds.
 ACCESSION AF179752
 KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>487
 /gene="GGO102"
 CDS <1..>487
 /gene="GGO102"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VVICHPLHYTVIMREEFCVFLVAVSWILSCASSLSHTVLLTQLS

FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
 LGVPSTKGIHKALSTCGSHLSVVSLLYYGSIFGQYLFPTVSSFIDKDVIVALMYTVVTP
 TL" (SEQ ID NO:213).

BASE COUNT 87 a 137 c 106 g 157 t

ORIGIN

1 tgtgtcata tgcaccctc tccactacac tgcacatcg aggggaagagt tctgtgtctt
 61 cttagtggtc gtattcttga ttctgtcttg tgccagctcc ctctctcaca ccgttctct
 121 gaccagctg tctttctgtg ctgcgaacac catccccat gtcttctgtg acctgtctgc
 181 cctgctcaag ctgtctctgt cagatatctt cctcaatgag ctggctcatgt tcacagtagg
 241 ggtggtggc attaccctgc cattcatgtg tatctgtgta tcatatggtt acattggggc
 301 caccatctg ggggtccctt caaccaaagg gatccacaaa gcattgtcca catgtggctc
 361 ccattctctt gtgggtcttc tctattatgg gtcaatattt ggccagtacc tttcccgac
 421 tgtaagcagt ttattgaca aggatgtcat tgggtgcttc atgtacacgg tggtcacacc
 481 cacgttg (SEQ ID NO:214).

OR132

LOCUS AF179753 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla GGO103 pseudogene, partial sequence.

ACCESSION AF179753

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>488
 /gene="GGO103"
 /pseudo

BASE COUNT 86 a 149 c 108 g 145 t

ORIGIN

1 tgcggtgtc tgccaccac tccgatatcc cactctcatg agctggcagc tgtgctgag
 61 gataaccatg ttgtcttggc tctgggtgc agctgacggg ctcatgcagg ctgttctac
 121 cctgagcttc ccatattgcg gtgcacacga gatcgatcac ttcttctgag agggccccgt
 181 gctggttcat ttgcttggc ctgacacttc agtcttcgaa aacgcatgt acatctgtg
 241 tgtgttaatg ctctgtgtcc cttttccct catctgttcc tctatgttc tcatctctgc
 301 tgcgttctg cacatgcgct ctacagaagc ccgcaagaag gcctttgcca cctgctcttc
 361 acatttggtg gtggtgggac tctttatgg agctgccatt ttacctata tgagaccacaa
 421 atcccacagg tccactaacc acgataaggt tgtgtcagcc ttctatagta tgttcacccc
 481 ttactaa (SEQ ID NO:215).

[illegible]

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AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..477

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>477

/gene="GGO106"

CDS <1..>477

/gene="GGO106"

/codon_start=2

/product="olfactory receptor"

/translation="VAIRKPLHYLVIMRQWVCVLLVMSWVGGFLHSVFQLSIIYGLP

FCGPNVIDHFFCDMYPLLKLVCTDTHVIGLLVVTNGGLSCTIVFLLLLISYGVLHSL

KKLSQKGRQKALSTCSSHITVVVFFVPCIFMYARPARSFIDKSVSVFYTVITPML"

(SEQ ID NO:217).

BASE COUNT 100 a 108 c 100 g 169 t

ORIGIN

1 tgtggccatc cgtaagccct tgcattattt gggtatcatg agacaatggg tgtgtgtgt

61 gctgctggta atgtcctggg ttggaggatt tctgcactca gtattcaac ttagcattat

121 ttatgggctc ccattctgtg gcccacatgt cattgatcac ttttctgtg acatgtatcc

181 cttattgaaa ctgtgtctgca ctgacacca tgttattggc ctcttagtgg tgaccaatgg

241 aggactgtct tgcactattg tgtttctgct ctactcatc tcttatgttg tcattctgca

301 ctctctaaag aaacttagtc agaaaggag gcaaaaagcc ctctcaacct gcagttccca

361 catcactgtg gttgtcttct tcttgttcc ttgtatttt atgtatgcta gacctgctag

421 gagcttcccc atgacaaat cagtgaagtgt gtttatata gtcataaccc caatgct (SEQ ID NO:218).

OR135

LOCUS AF179756 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla olfactory receptor (GGO107) gene, partial cds.

ACCESSION AF179756

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>488

/gene="GGO107"
 CDS <1..>488
 /gene="GGO107"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LAICYPLHYGAMMSSLLSVQLALGSWVCGFMAIAVPTALISGLS
 FCGPRAINHHFFCDIAPWIALACTNTQAVELVAFVIAVVVILSSCLITLVSYVYIIST
 LRIPSASGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSIKDALDLIKAVHVLNTVVTP
 VL" (SEQ ID NO:219).

BASE COUNT 84 a 155 c 108 g 141 t
 ORIGIN

1 tcttgcctc tgcctcctt tacctacgg agccatgatg agtagcctgc tctcagtgc
 61 gttggccctg ggcctcctggg tttgtggtt catggccatt gcagtgccca cagccctcat
 121 cagtggcctg tcttctgtg gccccctgc catcaaccac ttttctgtg acattgcacc
 181 ctggattgcc ctggcctgca ccaacacaca ggacagtagag cttgtggcct tttgattgc
 241 tttgtggtt atctgagtt catgctcat caccctgtc tctatgtgt acatcatcag
 301 caccatcctc aggatccct ctgccagtgg ccggagcaaa gccttctcca cgtgctcctc
 361 gcattctacc gtggtgctca tttgtatgg gtccacaatt ttcctcacg tccgcacctc
 421 tatcaagac gccttgatc tgatcaaagc tgtccacgtc ctgaacactg tggtgactcc
 481 agttttaa (SEQ ID NO:220).

OR136

LOCUS AF179757 480 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla GGO108 pseudogene, partial sequence.

ACCESSION AF179757

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 480)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 480)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..480
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>480
 /gene="GGO108"
 /pseudo

BASE COUNT 95 a 125 c 101 g 159 t

ORIGIN

1 tgtggcgggtg tgtaaccctc ttctctacac agttgcaatg tcccagaggc tttgctcct
 61 gttggtggt acatcatact gttgggggac agtctgttcc ctgacaccta ctttctactg
 121 gaattatcct tcagaggaaa taatatcatt aataactttg tctgtgagca cgctgtcatt
 181 gttgctgtgt cttgctcga cccctatttg agccaggaga tcaacttagt ttctgccaac

241 attcaatgaa ataagcagcc tggatgatcat tctcacttcc tatgctttca ttttatcac
 301 tgcacgaag acgcttcca ctggggggcg caagaaagcg ttctccacgt gtcctccca
 361 ctgacggcc attaccattt tccatgggac tatecttttc ctctactgtg ttctaactc
 421 aagttcgcg ctcacgtgca aggtggcctc tgccttttgc acagtggta ttcccatgtg (SEQ ID NO:221).

OR137

LOCUS AF179758 487 bp DNA PRI 31-DEC-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO109) gene, partial cds.
 10 ACCESSION AF179758
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 15 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 20 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 25 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 30 gene <1..>487
 /gene="GGO109"
 CDS <1..>487
 /gene="GGO109"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSHSQCVMVLVAGSWVIACACALLHTLLARLS
 FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 35 ML" (SEQ ID NO:222).
 40 BASE COUNT 95 a 148 c 93 g 151 t
 ORIGIN
 1 tgtggccatc tgcaccctc tacattatgc caccatcatg agtcacagcc agtgtgtcat
 61 gctggtggct gggctcctgg tcatcgcttg tgcgtgtgct cttttgcata cctctcctc
 121 ggcccggtt tcttctgtg ctgaccacat catcctcac ttctctgtg accttggtgc
 181 cctgctcaag ttgtctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
 241 attgacagcc attatgcttc cattctgtg catcctgggt tcttatgggc acattggggt
 301 caccatcctc cagattcctc ctaccaaggg catatgcaa gcctgttcca ctgtggatc
 361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
 421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
 50 481 catgttg (SEQ ID NO:223).

OR138

LOCUS AF179759 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA1) gene, partial cds.
ACCESSION AF179759
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA1"
CDS <1..>487
/gene="HSA1"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYPVMMSNKLSAQLLSISYVIGFLHPLVHVSLLLRLT
FCRFNIIHYFYCEILQLFKISCNGPSINALIIFIGAFIQIPTLMTIIISYTRVLFDI
LKKKSEKGRSKAFSTCGAHLLSVSLYYGTLIFMYVRPASGLAEDQDKVYSLFYTIIP
LL" (SEQ ID NO:224).
BASE COUNT 131 a 105 c 77 g 174 t
ORIGIN
1 tgtagccata tgtaatccct tgctttatcc agtggatgatg tccaacaaac tcagcgctca
61 gttgctaagt atttcatatg taattggttt cctgcatcct ctgggtcatg tgagtttact
121 attgegacta actttctgca ggtttaacat aatacattat ttctactgtg aaattttaca
181 actgttcaaa atttcatgca atgggtccatc tattaacgca ctaataatat ttatttttgg
241 tgcttttata caaataccca cttaatgac tatcataatc tcttatactc gtgtgtctct
301 tgatattctg aaaaaaaagt ctgaaaaggc cagaagcaa gccttctcca catgcggcgc
361 ccattctgctt tctgtctcat gtactacgg aactctgac ttcatgtatg tgcgtcctgc
421 atctggctta gctgaagacc aagacaaagt gtattctctg tttacacga ttataattcc
481 cctgcta (SEQ ID NO:225).

OR139

LOCUS AF179760 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA10) gene, partial cds.
ACCESSION AF179760
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA10"
CDS <1..>487
/gene="HSA10"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSRILSCASSLSHTLLLTRL
FCAANTVPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVDTP
ML" (SEQ ID NO:226).

BASE COUNT 87 a 142 c 106 g 152 t

ORIGIN
1 tgttgccata tgtcacctc tccactac tgatcatg aggaagagc tctgtgtt
61 cttagtgct gtatcggg tctgtctg tgccagctc ctctcaca cccttcct
121 gaccggctg tcttctgtg ctgcgaac cgccccat gtctctgtg acctgctgc
181 cctgctcaag ctgtctgct cagatatct cctaatgag ctggtcatg tcacagtagg
241 ggtggtggtc attacctgc cattcatgtg tatcctggt tcatatggct acattggggc
301 caccatcctg aggtgccct caacaaagg gatcacaaa gcattgtcca catgtggctc
361 ccattctct gtggtgtct tctattagg gtcaatatt ggccagtacc tttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacg tggacacac
481 catgttg (SEQ ID NO:227).

OR140

LOCUS AF179761 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA12) gene, partial cds.
ACCESSION AF179761
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"

10 gene <1..>487

/gene="HSA12"

CDS <1..>487

/gene="HSA12"

/codon_start=2

/product="olfactory receptor"

15 /translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFFCDMSALLKLAFSDTRVNEWVIFIMGGLILVIPFLLILGSYARIVSSI

LKVPSSKGICKALSTCGSHLSVVSIFYGTIVIGLYLCSSANSSTLKDTVMAMMYTVVTP

ML" (SEQ ID NO:228).

BASE COUNT 85 a 141 c 103 g 158 t

20 ORIGIN

1 tgtggccatc tgcctccccc tgcactacac cgccatcatg agccccatgc tctgtctcgc

61 cctgggtggc gtctcctggg tgctgaccac ctccatgcc atgttacaca ctctactcat

121 ggccagggtg tgttttggc cagacaatgt gatcccccac ttttctgtg atatgtctgc

181 tctgctgaag ctggccttct ctgacactcg agttaatgaa tgggtgatat ttatcatggg

241 agggctcatt ctgtcatcc cattcctact catcctggg tctatgcaa gaattgtctc

301 ctccatcctc aaggctccct ctctaaggg tatctgcaag gccctctcta ctgtggctc

361 ccactgtct gtgtgtgcac tgtctatgg aaccgttatt ggtctctact tatgctcatc

421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtagacccc

481 catgctg (SEQ ID NO:229).

OR141

LOCUS AF179762 486 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens HSA13 pseudogene, partial sequence.

35 ACCESSION AF179762

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>486
/gene="HSA13"
/pseudo

BASE COUNT 108 a 139 c 96 g 143 t

ORIGIN

1 cgtggcgtgtg tgtaaccccc tcctctatgc catagtcatg acaccaatga cccgcctggc
61 gctgctggcc ggggcatatt ctggcgccat agtcaattct gtgatctgca ctggctgcac
121 cttctctatc tccttctcta agtccaacca ttagacttc ttttctgtg acctcccacc
181 cctgctgaag ctgctctgta gtgaaaccag gccacgggaa tgggtgatct acctctcagc
241 ttttctggc atcacaacca gcatttcagt gattcttaca tegtactgt tcatcattca
301 gtctattctg aagattcgta cagcaggtgg aaagccaaga cttctccac ctgtgcttct
361 cacaagactg cattgactct cttcttggga acactcatat tcatatacct gaaaggcaac
421 atgggcgaat cccttgagga agacaagatc gtgtcaatat ttacactgt ggtcatcccc
481 atgcta (SEQ ID NO:230).

OR142

LOCUS AF179763 487 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens HSA16 pseudogene, partial sequence.

ACCESSION AF179763

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>487

/gene="HSA16"

/pseudo

BASE COUNT 111 a 110 c 96 g 170 t

ORIGIN

1 catggccatt gtgaaccctt tactttatag agtagctatg actaaaatag ttgtattgt
61 gctcgcatth gggctcatgta tgggagggtt aatcagctca ttgacacata caattggctt
121 ggtgaaactg tcttctgtg ggccaaatgt catcagtcac ttctctgtg atcttcccc
181 actgttgaag ctgtcatgtt ctgagacatc tatgaatgaa ttgtgcttt tgatcttctc
241 tggcattatt gccacgctca ctttttgac tgggtgatc tctacatct tcattgttgc
301 tgctatctg aggatccgct aagaagcagg tagacgtaaa gccttctcca cctgcacctc
361 tcacctgatt accgtgacct tattctatgg atcgataagc tttagttaca ttacgcaaaa
421 ctcccagtat tccttagaac aagaaaagggt ggtgtctgta tttatacc tggtggttcc
481 tatgtta (SEQ ID NO:231).

OR143

LOCUS AF179764 485 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA18 pseudogene, partial sequence.
5 ACCESSION AF179764
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Homo sapiens"
/db_xref="taxon:9606"
25 gene <1..>485
/gene="HSA18"
/pseudo
BASE COUNT 90 a 116 c 106 g 173 t
ORIGIN
30 1 cgtagggcatc tgtaaccac tggtagacac ggtcaccatg tctcccaga agtgtttgct
61 ccttttactg ggtgtctatg ggatggggat ttggggcctg tggctcatat gggaaacata
121 atgtttatgt cttttgtgg agacaacctt gtcaatcact atatgtgtga catccttct
181 ctccttgagc tctcctgcaa cagctcttac ataaattgc tggtagtttt tattattgtg
241 accgttgaca ttgggggtgc gattgtcacc atttttctct ctatgggttt tattctttcc
35 301 agcattctcc acattagttc cacagagggc aggtctaaag ccttcagtac ctgcagttcc
361 cacataattg tggtagcgt ttcttgggt caggtgcttt catgtacctc aaaccacctt
421 ctattctacc cctggaccag gggaaagtgt cctccatttt ttgtactgct gtggtgccca
481 tgttt (SEQ ID NO:232).

OR144

LOCUS AF179765 486 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA2 pseudogene, partial sequence.
45 ACCESSION AF179765
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
50 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 gene <1..>486
 /gene="HSA2"
 /pseudo

BASE COUNT 88 a 117 c 107 g 174 t

ORIGIN

1 cgtgggcatc tgtaaccac tggtgtacac ggtcaccatg tctcccaga tgtgtttgct
 61 ccttttactg ggtgtctatg ggggtgggat ttggggcctg tggctcatat gggaaacata
 121 atgtttatgt ccttttgg agacaacct gtcaatcact atatgtgtga catccttct
 181 ctcctgagc cctcctgcaa cagctcttac ataaattgc tgggtgtttt tattattgtg
 241 accgttgga tgggggtgcc gattgtcacc atttttctt cttatggtt tattctttcc
 301 agcattctcc acattagtc cacagagggc aggtctaaag ccttcagtac ctgcagttcc
 361 cacataattg tggatcgt tttcttggg tcagggtctt tcatgtacct caaacacct
 421 tctattctac ccctggacca ggggaaagtg tctccattt ttgtactgc tgggtgccc
 481 atgttt (SEQ ID NO:233).

OR145

LOCUS AF179766 487 bp DNA PRI 31-DEC-2000
 DEFINITION Homo sapiens olfactory receptor (HSA3) gene, partial cds.
 ACCESSION AF179766

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 gene <1..>487
 /gene="HSA3"
 CDS <1..>487
 /gene="HSA3"
 /codon_start=2
 /product="olfactory receptor"

/translation="VAICKPLHYVVMNNRVCTLLVLCCWVAGLMIIVPPLSLGLQLE
 FCDSNAIDHFSCDAGPLLKISCSDTWVIEQMVILMAVFALIITPVCVILSYLYIVRTI
 LKFPSVQQRKKAFSTCSSHMIVVSIAYGSCIFIYIKPSAKDEVAINKGVSVLTTSVAP
 LL" (SEQ ID NO:234).

5 BASE COUNT 114 a 113 c 97 g 163 t
 ORIGIN

1 tgtggccatc tgtaaaccctt ttcattatgt ggtcatcatg aacaacaggg tgtgtacctt
 61 attagtctc tgctgtggg tggctggctt gatgatcatt gtccaccac tagcttagg
 121 cctccagctc gaattctgtg actccaatgc cattgatcat ttagctgtg atgcaggtec
 10 181 tctcctaaag atctcatgct cagatacatg ggtaatagaa cagatggta tacttatggc
 241 tgtattgca ctcattatca cccagtttg tgtgattctg tctacttgt acatagttag
 301 aacaattctg aagttccctt ctgttcagca aaggaaaaag gccttttcta cctgttcac
 361 ccacatgatt gtggttcca ttgcctatgg aagctgcac tcatctata tcaagccctc
 421 tgcaaaagat gaggtggcca taaataaagg agtttcagtt ctactactt ctgtcgcacc
 15 481 ctgttg (SEQ ID NO:235).

OR146

20 LOCUS AF179767 487 bp DNA PRI 31-DEC-2000
 DEFINITION Homo sapiens olfactory receptor (HSA5) gene, partial cds.
 ACCESSION AF179767
 KEYWORDS .
 SOURCE human.

ORGANISM Homo sapiens
 25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

40 /organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>487

/gene="HSA5"

CDS <1..>487

/gene="HSA5"

45 /codon_start=2

/product="olfactory receptor"

/translation="VAICHPLHYTVIMREELCVFLVAVTWILSCASSLSHTLLLTRLS

FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMCILVSYGYIGATI

LRVPSTKGIHKALSTCGSHLSVVSLEYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP

50 ML" (SEQ ID NO:236).

BASE COUNT 88 a 141 c 105 g 153 t

ORIGIN

1 tgttgccata tgcaccctc tccactacac tgcacatg agggagagc tctgtgtctt

61 cttagtggct gtaactgga ttctgtcttg tgccagctcc ctctctcaca ccttctcct

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>488

/gene="HSA7"

/pseudo

BASE COUNT 95 a 141 c 103 g 149 t

ORIGIN

1 catggccatc tgcaagccct tttatatgg aagcaaatg accaggtgtg tctgcctctg
61 tctggctgct gctccctata tttatggctt tgcaaatggt ctaagcacag accaccctga
121 tgcttcgtct gtccttctgt ggacccaatg acatcaacca cttttactgt gcggaccac
181 cctcttagt cctgcctgc tcagatactt atgtcaaaga gaccgccatg ttggtggtgg
241 ctggttccaa cctcatttgc tctctaccg tcactcctcat ttctacact ttcatttca
301 ctgccattct gcgtatccac actgctgagg ggaggcgcaa ggccttctcc acctgcgggt
361 ctcatgtgac cgctgtcact gtcttctatg ggacactgtt ctgcatgtac ctgaggcccc
421 cttctgagac atctatacaa caggggaaaa ttgtagctgt tttttatc tttgtgagtc
481 cgatgtta (SEQ ID NO:239).

OR149

LOCUS AF179770 487 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens olfactory receptor (HSA8) gene, partial cds.

ACCESSION AF179770

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"
 gene <1..>487
 /gene="HSA8"
 CDS <1..>487
 /gene="HSA8"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTSIMNRKLCTLLVLCAWLSGFLTIFPPLMLLLQLD
 YCASNVIDHFACDYFPLLQLSCSDTWLLEVIGFYFALVTLFTLALVILSYMYIIRTI
 LRIPSASQRKKAFSTCSSHMIVISISYGSCIFMYANPSAKEKASLTKGAILNTSVAP
 ML" (SEQ ID NO:240).

BASE COUNT 115 a 119 c 80 g 173 t
 ORIGIN

1 tgttgcctc tgcaagcccc ttcattacac atccatcatg aacaggaaac tctgcactct
 61 acttgtgctg tgtgcctggc taagtgggtt tctgaccatt tcccacccc ttatgcttct
 121 cctccagctg gattactgtg ctccaacgt cattgatcac ttgcatgtg actattttcc
 181 cctcttaca ctatctgtt cagatacatg gctcctagaa gtaattgggt ttacttttgc
 241 ttgtgtact ttgctgttca cttggcatt agtgatttta tctacatgt acattatcag
 301 gaccattttg agaatcccgt ctgccagtca aagaaaaaag gctttctcca ctgttcttc
 361 tcacatgatt gtcatttcca ttcttatgg aagctgtata tcatgtatg ctaatccatc
 421 tgcaaaagaa aaggcatcat tgacaaaagg aatagctatt ctcaatacat ctgttgcccc
 481 catgctg (SEQ ID NO:241).

OR150

LOCUS AF179771 485 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU145) gene, partial cds.
 ACCESSION AF179771
 KEYWORDS .

SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 485)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 485)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 source 1..485
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>485
 /gene="EFU145"
 CDS <1..>485
 /gene="EFU145"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICQPLQYSTAMSHQLCALMLAMCWLLTNCPALMHTLLLTRVA

FCAQRAIPHFYCDPSALLKLACSDTRINELMIAMGLAFLTVPLTLIVFSYVRISWAV
LGISSPGGRCKAFSTCGSHLTVVLLFYGSLMGVYLLPPSSYS TERESRAAILYMVIIP
M" (SEQ ID NO:242).

BASE COUNT 78 a 155 c 114 g 138 t

ORIGIN

1 tgtggccatc tgccagccac tccaatacag cacagctatg agtcaccagc tctgtgcact
61 catgctggcc atgtgctggc tgctaacaa ctgtcctgca ttgatgcaca cgctgttgct
121 gaccctgtgt gctttctgtg cccagagggc catccccac ttctactgtg atcccagtgc
181 tctcctgaag ctgcctgct cggatacccg cataaacgag ctgatgatca tcgcatggg
241 cttggccttc ctcacgggtc ccctcacgct gatcgtcttc tctacgtcc gcatctcctg
301 ggctgtgctt ggcatctcgt ctctggagg gcgatgcaa gccttctcca cctgtgggtc
361 tcactcacg gtggttctgc tctctatgg gtctcttatg ggtgtgtatt tgcctcctcc
421 gtcacttac tctacagaga gggaaagcag ggctgccatt ctctacatgg tgatcatcc
481 catgt (SEQ ID NO:243).

OR151

LOCUS AF179772 485 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU146 pseudogene, partial sequence.

ACCESSION AF179772

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>485

/gene="EFU146"

/pseudo

BASE COUNT 98 a 145 c 110 g 132 t

ORIGIN

1 cgttgccatc tgcaagcccc tccactaccc ggtgctcatg agcagcaggg tctgcacaca
61 gctcatctc gctgctggc tggcagggtt ctcttcacac attgtgcctg tcactctgac
121 cagttagctt ccattctgtg acaccacat caaccacttc ttctgtgact atacactct
181 aatggaggtg gtctgcagtg ggccaaagggt gctggagatg gtggatttta ccctggcctt
241 ggtggcaccg ctcagcacct tgggtctgat caccctgtcc tacatccaga tcacagcac
301 gattgtcagg atcccctctg tccaggagag gaaaaaggct ttctccacct gtctctcca
361 tgtcatgtg gttaccatgt gctatggaaa gctgttttt tatgtatgtc aagccctccc
421 caggcaaaagg ggttgatcta aacaaaggag tgtctctaat caatacagtt attgcccccc
481 tcttg (SEQ ID NO:244).

OR152

LOCUS AF179773 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU147) gene, partial cds.
5 ACCESSION AF179773
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
25 gene <1..>487
/gene="EFU147"
CDS <1..>487
/gene="EFU147"
/codon_start=2
30 /product="olfactory receptor"
/translation="VAICLPLHYTMVMKPRCCLMLVAASWLCSHCLAFSLTLLMTQFS
FCASHSIQHFFCDVPPLLKLACSDTHIFQVTMLTEGVLSGVIP L TCVLVSYAHIMHTI
LRIPSAGGKHKVFSTCGSHLSVVTFLFYGTFLVYFQPSSSYSADTGMVACVVYTMVTP
MV" (SEQ ID NO:245).
35 BASE COUNT 86 a 161 c 93 g 147 t
ORIGIN
1 cgtggccatc tgccttctc tgcactacac catggtcatg aaaccccgat gctgcctgat
61 gctgggggca gcatctggc tctgctcca ctgctggct tctctctca ccttctgat
121 gactcagtc tcattctgt cctccattc catccaacac ttttctgtg atgtacccc
40 181 actcctcaa ctgctgtt cagacacca tatcttcag gtcacaatgt taactgaagg
241 agtccttca ggtgtgatc ctctacctg tgcctgggc tctatgcc acatcatgca
301 caccatctc aggatccct ctgctgggg caagcacaaa gtcttctta cctgtggctc
361 tcactgtca gtggtcact tctctatgg gacctctt ctggtgtatt tccagcctc
421 atcctctac tcagcagata ctggaatgt ggcattgtg gtatacacga tggtcacccc
45 481 catggtg (SEQ ID NO:246).

OR153

LOCUS AF179774 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Eulemur fulvus olfactory receptor (EFU148) gene, partial cds.
ACCESSION AF179774
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU148"
CDS <1..>487
/gene="EFU148"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYVAIMSNTVCRRLVFCCWVAGLFIIIPPLSLGLNLE
FCDSDTIDHFICDASPLLNISCSNTWFMEQTVIICAVLTLIMTLMCVVLSYIYIIKTI
LGFSSAQKKKAFSTCSSHMIVVSITYGSYIFIYIKPSAKEEVAINKGVTVLTTSIAP
ML" (SEQ ID NO:247).

BASE COUNT 118 a 118 c 88 g 163 t

ORIGIN
1 ttgtggccatc tgcaaacgc tgccattatg ggccattatg agtaacacag tctgcagaag
61 acttgctttt tgtgtgtgg tagctgtgt gttattata atccctccac ttacctggg
121 cctaatactg gaatttttg atctgatac cattgatcat ttatctgtg atgcactcc
181 cctctgaat atctctgtt caaatactg gttcatggaa cagactgtta tcactgtgc
241 agtgcgtacc ctccattatg cacttatgtg tgtagttctg tctacattt atactatcaa
301 gacaatttta ggattctct ctgccagca aaagaaaaa gcctttcca cctgttcttc
361 ccacatgatt gtggtgtcca tcacctagg cagctacac tcactcata tcaaacctc
421 tgcaaggaa gaagtatcca ttaacaaggg tgtgacagtc ctactactt ccactgcccc
481 catgctg (SEQ ID NO:248).

OR154

LOCUS AF179775 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU149) gene, partial cds.
ACCESSION AF179775
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>487

/gene="EFU149"

CDS <1..>487

/gene="EFU149"

/codon_start=2

/product="olfactory receptor"

/translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLLKLD

YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI

LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVLSKAVAVLITSVAP

ML" (SEQ ID NO:249).

BASE COUNT 109 a 113 c 91 g 174 t

ORIGIN

1 ttgtgctatc tgtaagcccc tgcattacag ggctcatcatg aatcgaagag tctgcacact

61 gctcgtcttt gcctcttggc tggtttcatt ctaatcgta ttccagcac tcatgttgct

121 cttaaagctt gattactgtg gatttaatat tattgacat ttacctgtg attattttcc

181 cctgctgcag ctttctgtt cagatacaaa attcctggag ataatggggt tttcctgtgc

241 tgtgttact ctaatgttca ctttggcatt aatatttctg tctacatgc acatcgtgag

301 aacgattttg agaattcctt ctactagtca gaggacaaaag gccttttcta catgttcttc

361 ccacatgatt gtcatctcca tctcttatgg cagctgcatt ttatgtaca ttaagccctc

421 agcaaaggat agagtatctt tgagcaaggc agtggctgtg ctaatcacct cagtagctcc

481 catgctc (SEQ ID NO:250).

OR155

LOCUS AF179776 484 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU150 pseudogene, partial sequence.

ACCESSION AF179776

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>484
/gene="EFU150"
/pseudo

BASE COUNT 80 a 157 c 112 g 135 t

ORIGIN

1 tctggctatc tgctatcctc tacactacgg gacaatcatg agcagcctgc tggctgcaca
61 gctggccttg ggctcctggg tctgtggtt cctggccatt gcagtgtga cggcccttat
121 cagtggcctg tccttctgtg gcgcccgtgc catcaatcac ttcttctgtg acattgcacc
181 ctggatgcc ctggcctgta ccagcacaca ggcaatagag ctctggcct ttgtgattgc
241 tttgtggc atcctgagtt catgcctcat caccctggtc tctacgtgt acattatcag
301 caccatcctc aggatcccat ctgccagcgg cggagcaaa ccttctctac gtgtcctct
361 caccacccg tgggtcctat ctggtatggg tccacgattt ttctcatgt cgcacacct
421 atcacagacg ccttggatct gaccaaagct gtccatgtcc tgaacaccgt ggtgactcca
481 gttc (SEQ ID NO:251).

OR156

LOCUS AF179777 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU151) gene, partial cds.

ACCESSION AF179777

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>487

/gene="EFU151"

CDS <1..>487

/gene="EFU151"

/codon_start=2

/product="olfactory receptor"

/translation="LAICYPLHYRTIMSSLLATQLALGSWVCGLAIAVLTALISGLS

FCGARAINHFFCDIAPWIALACTSTQAIELVAFVIAFVVILSSCLITLVSYVYIIST

LRIPSASGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSITDALDLTKAVHVLNTVVTP

VL" (SEQ ID NO:252).

BASE COUNT 83 a 159 c 110 g 135 t

ORIGIN

1 tctggctatc tgctatcctc tacactacag gacaatcatg agcagcctgc tggctacaca
61 gctggccttg ggctcctggg tctgtggtt cctggccatt gcagtgtga cggcccttat
121 cagtggcctg tccttctgtg gcgcccgtgc catcaaccac ttcttctgtg acattgcacc

181 ctggattgcc ctggcctgca ccagcacaca ggcaatagag ctggtggcct ttgtattgc
 241 tttgtggc atcctgagtt catgcctcat caccctggc tcctacgtgt acattatcag
 301 caccatcctc aggatcccat ctgccagcgg ccggagcaaa gccttctcta cgtgctcctc
 361 tcacctcacc gtgggtctca tctggtatgg gtccacgatt tttctcatg tccgcacctc
 421 catcacagac gccttggatc tgaccaaagc tgtccatgct ctgaacaccg tggtgactcc
 481 agttcta (SEQ ID NO:253).

OR157

10 LOCUS AF179778 487 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU153) gene, partial cds.
 ACCESSION AF179778
 KEYWORDS .
 SOURCE Eulemur fulvus.
 15 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 30 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>487
 /gene="EFU153"
 CDS <1..>487
 35 /gene="EFU153"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLLKLD
 YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI
 40 LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKAVAVLITSVAP
 ML" (SEQ ID NO:254).
 BASE COUNT 109 a 113 c 91 g 174 t
 ORIGIN
 1 tgttgctatc tgtaagcccc tgcattacag ggatcatcatg aatcgaagag tctgcacact
 45 61 gctcgtcttt gcctcttggc tggtttcatt cttaatcgta ttccagcac tcatgttgct
 121 cttaaagctt gattactgtg gatttaatat tattgacat ttacctgtg attatttcc
 181 cctgctgcag ctttctgtt cagatacaaa attcctggag ataatggggt tttcctgtgc
 241 tgtgttact ctaatgtca ctttggcatt aatatttctg tctacatgc acatcgtgag
 301 gacgattttg agaattcctt ctactagtca gaggacaaag gccttttcta catgttcttc
 50 361 ccacatgatt gtcactcca tctttatgg cagctgcatt ttatgtaca ttaagccctc
 421 agcaaaaagat agagtatctt tgagcaaggc agtggctgtg ctaatcacct cagtagctcc
 481 catgctc (SEQ ID NO:255).

OR158

LOCUS AF179779 488 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU154) gene, partial cds.
5 ACCESSION AF179779
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
25 gene <1..>488
/gene="EFU154"
CDS <1..>488
/gene="EFU154"
/codon_start=2
30 /product="olfactory receptor"
/translation="MAICHPLRYPVFMNHRVCLFLASGCWFLGSVDGFMLTPITMTFP
YCRSREIHHSFCEVPAVTTLSGSDTSLYEMLMYLCCVLMMLIPVTVISSYSFILLTI
HRMGSAEGRKKAFATCSSHMTVVILFYGAAIYTYMLPSSYHTPEKDMMVSVFYTILTP
VL" (SEQ ID NO:256).
35 BASE COUNT 92 a 163 c 95 g 138 t
ORIGIN
1 catggccatc tgccatccgc tccgttacc tgtcttcacg aaccacaggg tgtgtctctt
61 cctggcatct ggctgctggt tcttgggac agtagatggc ttcagctca ctccaatcac
121 catgaccttc ccctactgca ggtcccggga gattcaccat tcctctgcg aagtcctgc
40 181 tgtaacgacg ctttctgct cagacacctc actctatgaa atgctcatgt acctgtgctg
241 tgtctcatg ctctctatc ctgtgacagt cattcaagc tcctattcat tcattctcct
301 caccatccac aggatgggct cagcagaggg ccggaagaag gcctttgccca cctgttcctc
361 ccacatgacc gtggttatcc ttttctatgg ggccgccatc tacacctaca tgctccccag
421 ctctaccac actcctgaga aggacatgat ggtgtctgtc tttatacca tcctaactcc
45 481 tgtgctaa (SEQ ID NO:257).

OR159

LOCUS AF179780 488 bp DNA PRI 31-DEC-2000
50 DEFINITION Eulemur fulvus EFU155 pseudogene, partial sequence.
ACCESSION AF179780
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..488
15 /organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>488
/gene="EFU155"
/pseudo

20 BASE COUNT 111 a 113 c 91 g 173 t
ORIGIN
1 tgttgctatc tgtaagcccc tgcattacaa ggatcatcatg aatcgaagag tcgtgcacac
61 tgctcgtctt tgctcttgg ctggtttcat tcttaatcgt attcccagca ctcatgttgc
121 tcttaagct tgattactgt ggatttaata ttattgacca tttacctgt gattatttc
25 181 ccctgctgca gctttctgt ttagatacaa aattcctgga gataatgggg ttttctgtg
241 ctgtgtttac tctaattgtc actttggcat taatatttct gtcctacatg cacatcgtga
301 gaacgatttt gagaattcct tctactagtc agaggacaaa ggccttttct acatgttctt
361 cccacatgat tgcattctcc atctcttatg gcagctgcat tttatgtac attaagccct
421 cagcaaagga tagagtatct ttgagcaagg cagtggctgt gctaatacc tcagtagctc
30 481 ccatgcac (SEQ ID NO:258).

OR160

LOCUS AF179781 486 bp DNA PRI 31-DEC-2000
35 DEFINITION Eulemur fulvus EFU156 pseudogene, partial sequence.
ACCESSION AF179781
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
45 Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..486
/organism="Eulemur fulvus"

gene /db_xref="taxon:13515"
<1..>486
/gene="EFU156"
/pseudo

5 BASE COUNT 119 a 110 c 93 g 164 t
ORIGIN

1 tgtggccatc tgcaagcccc tgcattatgt gaccgtcatg aacagcagag ttgcaggat
61 tctcatcatc tgtgttggg tggctggtt atgcataata atccctccac ttagcctggg
121 tttaaatcta aaattctgtg actctaact gattgatcat ttggttgcg atgcatttcc
10 181 cctggtgaaa atctcatgct cagacacatg gtccatggaa cagacggta tcatctgtgc
241 tgtgctgacc ctgaatatga ctctaacttg ttagttctg tcatagcgtt acatcatcaa
301 gacaattttt agattccctt ctgtccagca aaggaaaaag gcctttcca cctgttcttc
361 ccacatgatt gtggtttcca tcacctatgg cactgtcatt tcatctaca tgaatcctac
421 agcaaaggaa gaagtgaccg ttaataaagt agtttcttg ctcatttctt ctattttgct
15 481 acattg (SEQ ID NO:259).

OR161

20 LOCUS AF179782 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU157 pseudogene, partial sequence.
ACCESSION AF179782
KEYWORDS .

SOURCE Eulemur rubriventer.

25 ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Eulemur rubriventer"

40 /db_xref="taxon:34829"

gene <1..>486

/gene="ERU157"

/pseudo

45 BASE COUNT 78 a 157 c 112 g 139 t
ORIGIN

1 cgtggccatc tgccagccac cccaatacag cacagctatg agtccccagc tctgtgcact
61 catgtggccc atgtgtctgc tgctaaccag ctgtctctgc ttagtcaca cgctgttgc
121 gaccctgtgt gctttctgtg cccagaaggc catccccac ttctactgtg atcccagtgc
181 tctctgaag ctgcctgtct cggataccg cataaatgag ctgatgatca tgcctatggg
50 241 ctgacgttc ctactattc cctcacact gatcgtcttc tctactgtcc gcactcctg
301 ggctgtgctt ggcatctcgt ctctggcgg gcgatgcaag gccttctcca cctgtgggtc
361 tcatctcagc gtggttctgc tctctatgg gtctctatg ggtgtgtatt tgcttctcc
421 gtcatcttac tctacagaga gggaaagcag gctgccatc tctacatggt gatcattccc
481 atgtta (SEQ ID NO:260).

OR162

LOCUS AF179783 484 bp DNA PRI 31-DEC-2000
5 DEFINITION Eulemur rubriventer ERU159 pseudogene, partial sequence.
ACCESSION AF179783
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
15 Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Eulemur rubriventer"
25 /db_xref="taxon:34829"
gene <1..>484
/gene="ERU159"
/pseudo
BASE COUNT 123 a 103 c 94 g 164 t
30 ORIGIN
1 tgtggccatc tgcaaccac tgaggatcc catcatcatg aacagggtgt tataagtgc
61 aatggctgca tggcttggga tcataggcta tctgatctcc ttagtgaaa cagtcttgac
121 aatgatattg cctttctgtg gcaataatgt cattgatcat attacctgtg agatcctggc
181 tcttaaactc atatgctcag atatttccat gaatgtgctt atcatggcag tggcaagtat
35 241 tgttatattg gtgattcctc tgctgttcat tttatctcc tatgtattca tcctctcttc
301 catcctgaga attaattctt ctgaggggag aaagaaagcc ttgcaacct gttcagccca
361 cctgactgtg gtcactttat tctatgggtc agctcttttt atgtacatga agcctaagtc
421 aaagtacaca aaagtatctg atgaaatcat tgcactgtct tacggagtag taaccccaat
481 gttg (SEQ ID NO:261).

OR163

LOCUS AF179784 487 bp DNA PRI 31-DEC-2000
45 DEFINITION Eulemur rubriventer olfactory receptor (ERU160) gene, partial cds.
ACCESSION AF179784
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
50 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
5 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"
10 /db_xref="taxon:34829"
gene <1..>487
/gene="ERU160"
CDS <1..>487
15 /gene="ERU160"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTTIMREELCTLLVAISWLLSCASSLSHTLLLTRL
FCAANVIPNFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFLCILVSYGYIGATI
LRVPSTKGICKALSTCGSHLSVVSLLYYGAIFGQYLPALSNSIDKDIIVAMMYTVVTP
20 ML" (SEQ ID NO:262).
BASE COUNT 91 a 143 c 104 g 149 t
ORIGIN
1 tgttgccata tgtcacccctc tccactacac caccatcatg aggggaagagc tctgcacctt
61 attggtggct atactctggc tcctgtcttg tgccagctcc ctctcccaca cccttctct
25 121 gaccgggctg tccttctgtg ctgctaattg cattcccaac ttcttctgtg acctgtctgc
181 tctgtctaag ctgtctctgt cagacatctt cctcaatgag ctggtcatgt ttacagtagg
241 ggtggtggtc attacctgac cattcttatg tatcttggtg tcttacggct acattggggc
301 caccatcctg aggggtccct caaccaaagg gatctgcaaa gcattatcca cgtgtggggtc
361 ccattctctt gtggtgtctc tgtactacgg ggcaatattt gggcagtagc ttttccagc
30 421 attagcaat tcattgaca aggacatcat tgtggctatg atgtacacgg tggtcacacc
481 catgttg (SEQ ID NO:263).

OR164

35 LOCUS AF179785 475 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU161) gene, partial cds.
ACCESSION AF179785
KEYWORDS .
SOURCE Eulemur rubriventer.
40 ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
REFERENCE 1 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..475

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/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene    <1..>475
/ gene="ERU161"
5  CDS    <1..>475
/ gene="ERU161"
/ codon_start=2
/ product="olfactory receptor"
/ translation="VAICKPLHYMNIMSRQLCHLLVAGSWLGGFLHSIIQIFITIQSP
10  FCGPNVIDHYFCDLLPLFKLACTDTFVEGLTVLANSGLIPVCSLFILVSSYIIILVHL
RKHSAEGRHKALSTCASHITVVILFFGPAIFLYMRPSSFTEDKLMGVLYTVITPS" (SEQ ID
NO:264).

```

BASE COUNT 92 a 133 c 97 g 153 t

ORIGIN

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15  1 cgtggcaatc tgcaagcctc ttcattacat gaatattatg agtcgtcaac tgtgtcacct
61 tctgttggtc ggttcctggc tgggaggcct tcttcaactc attattcaga tttttatcac
121 catccaatcg cctttttgtg gtccaacgt gattgaccac tacttctgtg acctcctgcc
181 attattcaag ctgctctgca ccgacacctt ttagaggggg ctgactgtgt tggccaatag
241 tggcttaatt cccgtgtgct cctgtttat cctggtgtcc tctatatca ttattctggt
20  301 gcacttgagg aacattctg cagaggggag gcacaaagcc ctctctacct gtgcctctca
361 catcacggtg gtcattttgt ttttggacc tgccatcttc ctctacatgc gaccttctc
421 taccttcaca gaagacaaac tcattgggtg gttgtacaca gtcacaccc ccagt (SEQ ID NO:265).

```

OR165

```

25  LOCUS  AF179786 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU162) gene, partial cds.
ACCESSION AF179786
KEYWORDS .
30  SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
35  AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
40  AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
45  source 1..487
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>487
/ gene="ERU162"
50  CDS <1..>487
/ gene="ERU162"
/ codon_start=2
/ product="olfactory receptor"
/ translation="VAISNPPLYVQAMPRKLCICFIICSYTGGFVNAILTSNTFTLD

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FCGDNVIDDFFCDVPPLVKLACDVEGSYQAVLYFLLASNVISPAMLILASYVFIIAAV
LVRSSRGRLLKAFSTCSSHLISVTLYYGSILYIYSRPSSSYSLERDKMVSTFYTVLFP
TL" (SEQ ID NO:266).

BASE COUNT 91 a 158 c 98 g 140 t

ORIGIN

1 tgtggccatc tccaaccccc cgctctatgt tcaggccatg ccaaggaaac tgtgcatctg
61 ttccattatc tgttcataca ctggaggctt tgtaatgca ataataataa ccagcaacac
121 attcacgttg gattttgtg gtgacaatgt catcgacgac ttttctgtg atgtcccacc
181 cctgggtgaag ttggcctgtg atgtggaagg gagctaccag gctgtgctgt acttctctct
241 ggccctcaac gtcattctcc cgcccatgct catcctcgcc tctacgtct tcatcatcgc
301 agcagctctg agggctccgct ccagccgggg ccgcctcaag gccttctcca cgtgctcctc
361 ccacctgac tctgttacct tatactacgg ctccattctc tacatctact ctgcccgaag
421 ttccagctat tccctcgaga gggacaaaat ggtctctacc tttaacccg tgctgttccc
481 cagctc (SEQ ID NO:267).

OR166

LOCUS AF179787 478 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur rubriventer olfactory receptor (ERU163) gene, partial cds.

ACCESSION AF179787

KEYWORDS .

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..478

/organism="Eulemur rubriventer"

/db_xref="taxon:34829"

gene <1..>478

/gene="ERU163"

CDS <1..>478

/gene="ERU163"

/codon_start=2

/product="olfactory receptor"

/translation="VAVCNPLHYLTVMNRQLCLQLVFACWCGGFIHSVTQVILVIQLP

FCGPNKLDSFYCDVPEVIKLACLDITYVVEVLMVNTNSGLLSLVCFLVLIFS yatilTTL

RTLRLHQGQSKAFSTCASHLMVSLIFVPCVFIYLRPFCSFSVDKIFSVFYMVITPML" (SEQ ID
NO:268).

BASE COUNT 85 a 132 c 108 g 153 t

ORIGIN

1 tgttgccgta tgtaaccctt tgcattacct gacggtcacg aaccgccagc tctgccttca
61 gttgggtttt gcctgctggt gtgggggttt catcactct gtcacacagg ttatactggt
121 catccagctg ccttctgtg gccccaacaa attggacagt ttctactgtg atgtcccaga

181 ggatcatcaag ctggcctgcc tggacaccta tgggtagaa gtgctgatgg ttaccaacag
 241 tggctctgcta tctctgtct gcttcttggc ttgatattc tctatgcc ccatcctgac
 301 caccctgaga actgcctcc accagggcca gagcaaggcc tctctacct gtgcctccca
 361 cctaattgtg gtcagcctga tctttgtgcc atgtgtattc atctactga ggcctttctg
 5 421 cagcttctct gtggataaga tattctctgt gttttacatg gtgatcacac ctatgttg (SEQ ID NO:269).

OR167

LOCUS AF179788 487 bp DNA PRI 31-DEC-2000
 10 DEFINITION Eulemur rubriventer olfactory receptor (ERU164) gene, partial cds.
 ACCESSION AF179788
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 20 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 25 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Eulemur rubriventer"
 30 /db_xref="taxon:34829"
 gene <1..>487
 /gene="ERU164"
 CDS <1..>487
 35 /gene="ERU164"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTTIISTRVCILLVCSSWLAGFLIIFPPIILLQLD
 FCASNIIDHFICDSSPILQLSCTNTHFLELMAFCLAVVTLMVTLTLVILSYTNIIRTI
 LRIPSMSQRKKAFSTCSSHIIIVVSLSYGSCIFMYIKPSTRERVTLKGVAVVNTSVAP
 40 LL" (SEQ ID NO:270).
 BASE COUNT 116 a 116 c 79 g 176 t
 ORIGIN
 1 tgtggccatc tgcaaacctc ttcattacac aaccatcatt agcaccaggg ttgtatcct
 45 61 tctgtctgt agctctctgc ttgcaggatt ctgatcatc ttccaccaa taatccttct
 121 tctgcagtg gacttctgtg cctccaatat aattgatcat ttatctgtg attcttctc
 181 aattctgcag cttcttcta caaacactca cttctagaa ctcattgcat ttgttttagc
 241 cgtggtgaca ctcattgtca ccttgacct agttattctc tctatacaa atattatcgc
 301 gacaattcta agaattcctt ctatgagca aaggaaaaa gcctttcca ctgttcttc
 361 ccatataata gttgtttccc tctcttatgg tagttgtatc tcatgtaca taaagccttc
 50 421 tacaagggaagggtgactt taagcaaagg agtagctgtg gtaatactt cagtggctcc
 481 tcttttg (SEQ ID NO:271).

OR168

LOCUS AF179789 483 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU165 pseudogene, partial sequence.
5 ACCESSION AF179789
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..483
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
25 gene <1..>483
/gene="ERU165"
/pseudo
BASE COUNT 98 a 144 c 108 g 133 t
ORIGIN
30 1 cgttgccatc tgcaagcccc tccactaccc ccgtgctcat gaggcagcagg gtctgcacac
61 agtcatacct cgctgctgg ctggcagggt tctccttcat cattgtgcct gtcacatga
121 ccagtcagct tccattctgt gacacccaca tcaaccactt cttctgtgac tatacacctc
181 taatggaggt ggtctgcagt gggccaaagg tgctggagat ggtggatttt accctggcct
241 tgggtggcact gtcagcacc ttgggtgctga tcaccctgtc ctacatccag atcatcagga
35 301 cgattgtcag gatccccctc gtccaggaga ggaaaaaggc ttctccacc tgttctctcc
361 atgtcatcgt ggttaccatg tgctatggaa gctgttttt tatgtatgtc aagccctccc
421 caggcaaagg ggttgatcta aacaaaggag tgtcttaac aatacaatta ttgccccct
481 ctt (SEQ ID NO:272).

OR169

LOCUS AF179790 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU167) gene, partial cds.
45 ACCESSION AF179790
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
50 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..486
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>486
 /gene="ERU167"
 CDS <1..>486
 /gene="ERU167"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLRYTDMTPRLCGLLVSLSLICSADALLHSLMLLQLS
 FCTDLEISLFFCEVVQVVKLACSDTLVNNLLIYFAACTLGGIPLSGIIFSQTQIATSI
 LKMPSSGRKYKAFSTCGSHLSVVSFLFYGTGLGVYISSAVSDSSRRTAVASVMYTVVTP
 C" (SEQ ID NO:273).

BASE COUNT 83 a 139 c 107 g 157 t
 ORIGIN

1 tgtggccatc tgcaccctc tgagatacac agacatcatg actcctcgtc tgtgtggtct
 61 gctggttca ctttccctgt ccatttgctc cgcggatgcc ctgctccaca gcctcatgct
 121 gctgcagctg tccttctgca cagacctga aatctccctt ttcttctgtg aagtcgttca
 181 ggctgcaag ctgcgctgct ccgataccct cgtaacaac ctctgatct atttgcagc
 241 ttgcaccttg ggtggcattc ctctgtctgg catcattttt tcttacactc aaatagccac
 301 ctccattttg aaaatgccgt catcgggcag aaagtataaa gccttttcca cctgtgggtc
 361 tcacctgtca gttgtttccc tgttctatgg gacagggttg ggggtgtaca tcagttctgc
 421 agtttctgac tcttcaagga ggactgcggt ggcttcagtg atgtacactg tggtcactcc
 481 ctgttg (SEQ ID NO:274).

OR170

LOCUS AF179791 487 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU168) gene, partial cds.
 ACCESSION AF179791
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemnridae; Eulemur.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Eulemur rubriventer"

/translation="PAICQPLRYRVLNMHRLCVLLVGAAWVLCCLKSVTETVIAMRLP
FCGHHVVSHFTCEILAVLKLTCGNTSVSEVFLLVGSILLPVPLAFICLSYLLILATI
LRVPSAAGCRKAFSTCSAHLAVVLLFYSTIIFTYMKPKSKEAHISDEVFTVLYAMVTP
ML" (SEQ ID NO:277).

5 BASE COUNT 79 a 163 c 125 g 119 t
ORIGIN

1 cctgccatct gccagccact caggtaccgc gtgctcatga accaccggct ctgtgtgctg
61 ctgggtggag ctgcctgggt cctctgcctc ctcaagtcgg tgactgagac agtcattgcc
121 atgaggctgc cttctgtgg ccaccacgtg gtcagtcact tcacctgca gatcctggcg
10 181 gtgctgaagc tgacgtgagg taacacatcg gtcagcgagg tcttctgct ggtgggctcc
241 atcctgtgc tgctgtgcc cctggcattc attgctgt cctactgct catcctggcc
301 accatcctga gggtgccctc agctgctggg tgccgcaaag ccttctccac ctgctcagca
361 cacctggctg tgggtgtgct ttctacagc accatcatct tcacgtacat gaagcccaag
421 agcaagggaag cccacatctc tgatgaggtc ttacagtcc tctacgccat ggtcacaccc
15 481 atgttg (SEQ ID NO:278).

OR172

20 LOCUS AF179793 489 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY173 pseudogene, partial sequence.
ACCESSION AF179793
KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus
25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 489)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 489)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

40 source 1..489
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>489
/gene="MSY173"
/pseudo

45 BASE COUNT 95 a 120 c 104 g 170 t
ORIGIN

1 cgtggccatc tgtaaccac ttgtgtacac ggtcaccatg tctccccaga tgtgtttgct
61 ccttttgctg ggtgtctatg ggatgggggt tttggggct gtgactcata tgggaacat
121 aacgtttatg tctttttgtg gagacaacct tgtcaatcac tacatgtgtg acctccttc
50 181 tctccttgag ctctcttgca acagcactta cataaattg ctggtgggtt ttattattgt
241 gaccaatggc attgggggtc caattgtcac catttttate tcttatgggt ttattcttc
301 cagcattctc cacattagct ccacagaggg cagggtctaa gccttcagta cctgcagttc
361 cacataattg tggatcgct gttcttggg tcagggtgct tcatgtacct cacaccacct
421 tctagtctac ccttggaaca ggggaacgtg tctccattt ttatactgc tgtaatgccc

481 atgtagatt (SEQ ID NO:279).

OR173

5 LOCUS AF179794 481 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY174) gene, partial cds.
ACCESSION AF179794
KEYWORDS .
SOURCE Barbary ape.
10 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 481)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 481)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..481
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>481
/gene="MSY174"
30 CDS <1..>481
/gene="MSY174"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYATIMSQPMCGFLMGVAGILGFVHGGIQTFLFIAHLP
35 FCGPNVIDHFMCDLVPLLELACTDTHTLGPLIAANSGLCFLIFSMLVASYVILCSL
RTHISEGRHKVLSSCTSHIFVVILFFVPCSYLYLRPLTSFFPTDKAVTVFCTLFTPML" (SEQ ID
NO:280).
BASE COUNT 92 a 126 c 97 g 166 t
ORIGIN
40 1 tgtggccatc tgtaagccct tgcactatgc aaccatcatg agtcaaccta tgttgaggatt
61 cctgatgggg gtggctggga ttctgggatt tgtgcatgga gggatccaga cttgttcat
121 agcccactta ccattctgtg gccctaattgt catcgaccac ttatgtgtg atttagtacc
181 tcttctagag ctggcctgca cagacactca caccttgggg cctctgatag ctgccaacag
241 tggatcattg tgtttctca tttttccat gctgggtgct tcctatgtca tcactctgtg
45 301 ctcctaagg actcatatct ctgaaggcgc tcacaaagtt ctgtctagtt gtacctctca
361 tatcttgtt gtcatttat tctttgtccc ttgttcatac ctgtatctaa gacctctaac
421 ctccttctc cccactgaca aagctgtgac tgtgtttgc accctattha cacctatgtt
481 g (SEQ ID NO:281).

50 OR174

LOCUS AF179795 402 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY175 pseudogene, partial sequence.
ACCESSION AF179795

KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 402)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 402)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..402

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>402

/gene="MSY175"

/pseudo

BASE COUNT 89 a 105 c 77 g 131 t

ORIGIN

1 tgtggccatc tgaagcccc tgcattacac caccatcatg agcagcaaaa tctgcatgca
61 gcttgtgtctt ggggtgtggc ttgctggtt ctcgtcacct ttccaccact cctcttaggc
121 ctaaattctg actctgtgc ctgectcaa cgtcattaat cattctact gtgacactac
181 tccactctg cagatttct gcactgacac acagctcctg gacaggatgg gattcatttc
241 agcattggtg acactcttag tcacattggt aatggtgatg gtatcatgat atccctttct
301 tatggcagtt gcatcttcat gtatgttaag ccatcggtca aacaaaagat atattttca
361 aagggaattt tgggtgctca caccctgtgc gttccacttt tg (SEQ ID NO:282).

OR175

LOCUS AF179796 487 bp DNA PRI 31-DEC-2000

DEFINITION *Macaca sylvanus* olfactory receptor (MSY176) gene, partial cds.

ACCESSION AF179796

KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 source 1..487
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 5 gene <1..>487
 /gene="MSY176"
 CDS <1..>487
 /gene="MSY176"
 /codon_start=2
 10 /product="olfactory receptor"
 /translation="VAICNPLLYALVVSPKVCRLLVSLTYLQSLITALTVSSCVFSVS
 YCSSNIINHFYCDDVPLLALSCSDTYIPETA VFIFSGTNLFFSMTVVVLISYFNIVITI
 LRIRSEGRQKAFSTCASHMIAVVVFYGTLLFMYLQPRSNHSLDTDKMASVFYTLIIP
 ML" (SEQ ID NO:283).

15 BASE COUNT 104 a 123 c 87 g 173 t
 ORIGIN

 1 cgtggtatt tgcaaccctc tgctctacgc attagtgggtg tctccaaagg tatgtcgtct
 61 gctggtgtcc ctcacatacc ttcagagtct tatcacagcc ctactgtct ctctctgtgt
 121 gttctctgtg tcactactgtt ctccaacat catcaacat tttactgtg acgatgtccc
 20 181 ttgctagca ttgtcgtgtt ctgataccta cattccagaa acagcagtgt ttatcttttc
 241 agggaccaat ttgttttct ccatgaccgt tgttctgata tcctacttca acattgttat
 301 taccatttg aggatacgtt ctcagaagg acgacaaaaa gcctttcca cgtgtgcttc
 361 tcacatgata gctgtggttg tgtctatgg gactctcctt tcatgtatt tgcaaccaag
 421 gagtaatcac tcattagata ctgacaaaat ggctcgggtc ttctacccc tgatcatacc
 25 481 tatgttg (SEQ ID NO:284).

OR176

LOCUS AF179797 487 bp DNA PRI 31-DEC-2000
 30 DEFINITION Macaca sylvanus olfactory receptor (MSY177) gene, partial cds.
 ACCESSION AF179797
 KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus
 35 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

45 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

 source 1..487
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>487
 /gene="MSY177"
 CDS <1..>487

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/ gene="MSY177"
/ codon_start=2
/ product="olfactory receptor"
/ translation="VAICHPLHYAII MGQSQC VTLVAGSWVIACACALLHTLL LAWLS
5 FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHTAVTI
LQIPSTNGICKALSTCGSHLSAVTLYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:285).
BASE COUNT 94 a 146 c 91 g 156 t
ORIGIN
10 1 tgtggccatc tgcaccctc tacattatgc catcatcatg ggtcagagtc agtgtgtcac
61 gctggtggct gggctctggg tcatcgcttg tgcgtgtgct ctttgcaca ctctctcct
121 ggcttggtt tcttctgtg ctgacacat catccctcac ttctctgtg acctggtgc
181 cctgctcaag ttgtctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattctgtg tctctggtt tcttatggc acactgcagt
15 301 caccatctc cagattccct ctactaatgg catatgcaaa gcctgtcca cttgtggatc
361 ccactctca gcagtgcactc tctattatgg gaccattatt ggtctctatt ttctccccc
421 atccagcaac actaatgaca agaacataat tgcttcagt atatacacag tagtcactcc
481 catgttg (SEQ ID NO:286).

20 OR177

LOCUS AF179798 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY178) gene, partial cds.
ACCESSION AF179798
25 KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
30 Macaca.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
35 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
40 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
45 gene <1..>487
/ gene="MSY178"
CDS <1..>487
/ gene="MSY178"
/ codon_start=2
50 / product="olfactory receptor"
/ translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTQVNELAIFITGGLILVIPFLLILGSYARIVSSI
LKVPSKGICKAFSTCGSHLSVVSIFYGTVIGLYFCPSANSSTLKETVMAMMYTVVTP
ML" (SEQ ID NO:287).

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BASE COUNT 83 a 144 c 105 g 155 t

ORIGIN

1 tgtggccatc tgcttcccc tgcaactac cgccatcatg agcccatgc tctgtctgc
61 cctgggtggc ctgtctggg tactgaccac ctccatgcc atgttacaca ctttactcat
121 ggccagggtg tgttttgg cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactca agttaatgaa ttggcgatat ttatcacggg
241 agggctgatt ctgtcatcc caticctact catcctggg tcctatgcac ggattgtctc
301 ctccatcctc aagggtccctt cgtctaaggg tatctgcaag gccttctcta ctgtggctc
361 ccacctctct gtggtgtcac tgtctatgg gaccgttatt ggtctctact tctgcccac
421 agctaatagt tctactctaa aggagactgt catggctatg atgtacactg tggtagcccc
481 catgctg (SEQ ID NO:288).

OR178

15 LOCUS AF179799 484 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY179) gene, partial cds.
ACCESSION AF179799
KEYWORDS .

SOURCE Barbary ape.
20 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 484)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)
30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
35 source 1..484
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>484
/gene="MSY179"
40 CDS <1..>484
/gene="MSY179"
/codon_start=2
/product="olfactory receptor"
/translation="CAICCPHYTTAMSPKLCILLSLCWVLSVLYGLIHTFLMTTVT
45 FCGSRKIHIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIISYVLIVRAI
LRIPSVSKKYKAFSTCASHLGVVSLFYGTLCMVYLKPLHTYSVKDSVATVMYAVVTPM
M" (SEQ ID NO:289).

BASE COUNT 102 a 139 c 93 g 150 t

ORIGIN

50 1 atgtgccatc tgctgcccc tccactacac cacagccatg agccctaagc tctgtatctt
61 actctcttcc ttgtgtggg tcttatctgt gctctatggc ctcatacaca ccttctcat
121 gaccacgggtg accttctgtg ggtcacgaaa aatccactac atcttctgtg agatgtatgt
181 attgtctagg ctggcatgtt ccgacactca gattaatcac acagtgtctga ttgccacagg
241 ctgctttatc ttctcattc cctttggatt catgatcatt tcctatgtgt tgattgtcag

301 agccatcctc agaataccct cagtctctaa gaaatacaaa gccttctcca ctgtgcctc
 361 ccatttgggt gtagtctccc tcttctatgg gacactttgt atggataacc tgaagcccct
 421 ccatacctac tctgtgaagg actcagtagc cacagtgatg tatgcggtgg tgacacccat
 481 gatg (SEQ ID NO:290).

OR179

LOCUS AF179800 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus MSY180 pseudogene, partial sequence.

ACCESSION AF179800

KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>487

/gene="MSY180"

/pseudo

BASE COUNT 92 a 143 c 100 g 152 t

ORIGIN

1 tgctgccata tgtcacccctc tccattacac tgccatcatg aggggaagagc tctgtgtctt
 61 cttagtggct gtagtctgaa ttctgtcttg tgccagctcc ctctctcaca ccttctcct
 121 gaccagctg tctttctgtg ctggaacac catccccac atcttctgtg acctgtctgc
 181 cctgtcgaag ctgtctggt cagatatctt cctcaatgag ctggtcatgt tcacagtagg
 241 ggtggtggc attacctgc cattcatgtg tatcctggta tcatatggct aactggggc
 301 caccatctg agggtcctt caaccaaagg gatccacaaa gcattgtcca catgtgcctc
 361 ccattctctc gtggtttctc tctattatgg gtcaatattt ggccagtaac atttccaac
 421 tgtaagcagt tctattgaca aggatgttac tgtggctctc atgtacatcg tggcacacc
 481 cgtgttg (SEQ ID NO:291).

OR180

LOCUS AF179801 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus MSY181 pseudogene, partial sequence.

ACCESSION AF179801

KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>487

/gene="MSY181"

/pseudo

BASE COUNT 92 a 144 c 100 g 151 t

ORIGIN

1 tctgcccata tgcaccctc tccattacac tgccatcatg aggggaagagc tctgtgtctt
61 cttagtggct gtattctgaa ttctgtcttg tgccagctcc ctctctcaca cccttctcct
121 gaccagctg tctttctgtg ctgcgaacac catccccac atcttctgtg acctgtctgc
181 cctgctcaag ctgtcctggt cagatatctc cctcaatgag ctggatcatgt tcacagtagg
241 ggtggtggc attacctgc cattcatgtg tatectggta tcatatggct acactggggc
301 caccatctg agggctccct caaccaaagg gatccacaaa gcattgtcca catgtgcctc
361 ccattctct gtggtttctc tctattatgg gtcaatatt ggccagtaac atttcccaac
421 tgtaagcagt tctattgaca aggatgttac tgtggctctc atgtacatcg tggtcacacc
481 cgtgttg (SEQ ID NO:292).

OR181

LOCUS AF179802 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus olfactory receptor (MSY182) gene, partial cds.

ACCESSION AF179802

KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

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/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene      <1..>487
/feature   /gene="MSY182"
5         CDS      <1..>487
/feature   /gene="MSY182"
/feature   /codon_start=2
/feature   /product="olfactory receptor"
/feature   /translation="VAICKPLHYMVIMNNRVCTLLVLCSWVAGLMIIVPPLSLGLQLE
10         FCGSNAIDHFSCDAGPLLKISCSDTWVIEQIVILMAVFALIITLVCVILSYLYIVRTI
LRFPSVQQRKKAFTSCSSHMIVVSIAYGSCIFVYIKPSAKDEVAINKGVSVLTTSVAP
LL" (SEQ ID NO:293).

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BASE COUNT 115 a 113 c 98 g 161 t

ORIGIN

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15         1 tgtggccatc tgtaacccc ttcattatat ggatcatcatg aacaacaggg tgtgtacctt
61 attagtcctc tgcagttggg tggctggcctt gatgatcatt gttccaccac tgagcttagg
121 cctccagctc gaattctgtg gtcctaatgc cattgatcat tttagctgtg atgcaggtcc
181 tctcctaag atctcatgct cagacacatg ggtaatagaa cagatagtta tacttatggc
241 tgtatttgca ctattatca ccctagtttg tgtgattctg tctacttgt acatagtcag
20        301 aacaattctg aggttccctt ctgttcagca aaggaaaaag gccttttcta cctgttcac
361 ccacatgatt gtggtttcca ttgcctatgg aagctgcac ttcgtctata tcaagccctc
421 tgcaaagat gaagtggcca taaataaagg agtttcagtt ctactactt ctgttcgacc
481 ctgttg (SEQ ID NO:294).

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OR182

LOCUS AF179803 487 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA169) gene, partial cds.

ACCESSION AF179803

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA169"

CDS <1..>487

/gene="CJA169"

/codon_start=2

/product="olfactory receptor"

/translation="VAICRPLYYSTVMSPQVCALILALCWVLTNVVALTHTLLMARLS
FCVTGEIAHFFCDITPVLKLSGSDTHINEMMVFLGGTVLIVPFICIVTSYIHIVPAI
LRVRTCGGAGKAFSTCSSHLIVCIFYGTLSAYLCPPSIASEEKDIAAAALYTIVTP
ML" (SEQ ID NO:295).

5 BASE COUNT 89 a 147 c 103 g 148 t
ORIGIN

1 tgtggccatt tgcggccccc tgtactactc cacagtcacg agccccaag tctgtgccct
61 aatccttgca ttgtctggg tctcaccac ttgtgtgcc ctgactcaca cactcctcat
121 ggctcgactg tcttctgtg tgactgggga aatagctcac ttttctgtg acatcactcc
10 181 tgcctgaag ctatcatgtt ctgacacca catcaacgag atgatgggtt ttgtctggg
241 aggcacagta ctcattgtcc ctttatatg cattgtcacc tctacatcc acattgtgcc
301 tgcctatctg aggggtccgaa cctgtgtgtg ggcgggcaag gcctttcca cctgcagttc
361 ccacctctgc attgtttgta tattctatgg gacctcttc agtgcctacc tgtgtcctcc
421 cctattgcc tctgaagaga aggacattgc agcagctgca ctgtatacca tagtgactcc
15 481 catgttg (SEQ ID NO:296).

OR183

LOCUS AF179804 486 bp DNA PRI 31-DEC-2000

20 DEFINITION Callithrix jacchus olfactory receptor (CJA170) gene, partial cds.

ACCESSION AF179804

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>486

/gene="CJA170"

CDS <1..>486

/gene="CJA170"

/codon_start=1

/product="olfactory receptor"

/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS

FCTDLEIPRFFCELNQVIHLACSDTFLNDVVMYLA AVLGGGFLAGILYSYSKIVSSI

RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP

50 ML" (SEQ ID NO:297).

BASE COUNT 96 a 135 c 102 g 153 t

ORIGIN

1 gtggccatct gtcaccact gcactacaca gtcaccatta accccagact gtgtggactg
61 ctggttctgg catcctggat cctgagtgcc ctgaattcct cattacaaac cttaatatgt

121 ctgcggcttt ccttctgcac agacttgga atcccccgct tttctgcga acttaatcag
 181 gtcaccacc ttgcctgttc tgacacttt ctaaatgatg tggatgatga ttggccgct
 241 gtgctgctgg ggggtgtgcc cctgcaggg attcttact ctactctaa gatagttcc
 301 tccatagtg caatctcag agctcaggg aagtacaagg catttccac ctgtgtatct
 361 cacatctaa ttgtctcctt atttatggt acactcctag gtgtgtacct tagttctgct
 421 gcaactggca actcacattc aagagctgca gcctcgggta tgtacctgt ggtcaccccc
 481 atgctg (SEQ ID NO:298).

OR184

LOCUS AF179805 487 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA171) gene, partial cds.
 ACCESSION AF179805
 KEYWORDS .

SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA171"

CDS <1..>487

/gene="CJA171"

/codon_start=2

/product="olfactory receptor"

/translation="VAICNPLLYMVTMSPQVCLLLLGVYGMGALGAVAHMGNIMFMT

FCAETLVNHYMCDILPLELSCNSSYINLLVFIIVTIGIGVPIVTIFISYGFILSSI

LHISAEGRSKAFSTCSSHIVVLLFFGSGAFMYLKPPSILPLDQGVSSIFYTAVVP

MF" (SEQ ID NO:299).

BASE COUNT 88 a 118 c 107 g 174 t

ORIGIN

1 cgtggccatc tgtaaccac tgtgtacat ggtcaccatg tctcccagg tgtgcttgc
 61 cctttgttg ggtgtctatg ggtgggggc ttgggggct gtggtcata tgggaaacat
 121 aatgtttatg acctttgtg cagaaacct tgtaacacac tacatgtgtg acatccttc
 181 cctccttgag ctctcctgca acagctctta cataaattg ctgttggttt ttattattg
 241 gaccattggc attgggtgc ccattgtcac cattttatc tcttatggtt ttattcttc
 301 cagcattctc cacattagtt ctgctgaggg cagggtctaa gccttcagta cctgcagtc
 361 ccacatagtt gtggtattgc tttcttgg gtcaggagct ttatgtacc tcaaaccac
 421 ttctattcta ccctggacc aggggaaagt gtctccatt ttatatactg cggtggtgcc
 481 catgtt (SEQ ID NO:300).

OR185

LOCUS AF179806 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA196) gene, partial cds.

ACCESSION AF179806

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA196"

CDS <1..>487

/gene="CJA196"

/codon_start=2

/product="olfactory receptor"

/translation="LAICHPLHYSSKMSLCSTLMLGCLWTTASLHALLHTLLRLD

FCASNVIPYFFCDLVPLLQLSCSDTRLNQLMIVLVGGLIILLPFLGILGSYTCIAAAV

LRVPSARGTWKAFSTCGSHLTMVILFYGTISGVYLRPSSSHSTDKDSLASVMYMVVTP
ML" (SEQ ID NO:301).

BASE COUNT 78 a 176 c 105 g 128 t

ORIGIN

1 ctggccatc tggcaccgc tgcactactc ctccaagatg agcctgtgca gctgcaccct

61 aatgttgggc tgcttatgga ccaactgccag ctccatgcc cttctgcaca ccctctctt

121 ggcccggctg gactctgtg ccagcaatgt tatccctac ttctctgtg acctgttcc

181 cctgtccag ctctctgtt ctgacaccg actcaaccag ctcatgattg tgctgtggg

241 gggcctgac atcctctgc cttccttg cattctcgg tctacacat gcattgcagc

301 tgcagtgtc agagtcctc ctgccagggg tacgtggaag gcctttcca cctgtggctc

361 ccacgtgacc atgtcatcc tctctatgg caccatcctc ggggtctacc tgaggcctc

421 atcctccac tccacagaca aggactact agcctcagtg atgtacatgg tagtgacccc

481 catgctg (SEQ ID NO:302).

OR186

LOCUS AF179807 487 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA197) gene, partial cds.

ACCESSION AF179807

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA197"
CDS <1..>487
20 /gene="CJA197"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
25 FCTDLEIPHFCELNQVIHLACSDTFLNDVVMYLA AVLLGGGPLAGILYSYSKIVSSI
RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP
ML" (SEQ ID NO:303).

BASE COUNT 98 a 134 c 100 g 155 t

ORIGIN
1 tgttgccata tgcacccac tgcactacac agtcaccatt aaccccagac tgtgtggact
30 61 gctggttctg gcatcctgga tcttgagtgc cctgaattcc tcattacaaa ccttaatatg
121 gctgcggctt tcttctgca cagacttgga aatccccac ttttctgcg aacttaata
181 ggatcatcac ctggcctgtt ctgacacttt tcttaatatg gtggtgatgt atttgccgc
241 tgtgctgctg ggggggtggc cccttcagg gattctttac tcttactcta agatagtctc
301 ctccatacgt gcaatctcat cagctcagg gaagtacaag gcattttcca cctgtgtatc
35 361 tcacatctta attgtctct tattttatgg tacactccta ggtgtgtacc ttagttctgc
421 tgcaactggc aactcacatt caagagctgc agcctcgggtg atgtacactg tggtcacccc
481 catgctg (SEQ ID NO:304).

OR187

40 LOCUS AF179808 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA198) gene, partial cds.
ACCESSION AF179808
KEYWORDS .
45 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA198"

CDS <1..>487

/gene="CJA198"

/codon_start=2

/product="olfactory receptor"

/translation="IAICSPLLYNVIMSYHFCFRLTVGVYILGILGSTIHTSSMLRLF

LCKTNVINHYFCDLFPLLELSCSSTYINELLVLVLSALNILTPALTILASYIFTIASI

LHIRSTEGRSKAFSTCSSHISAVAVFFGSAAFMYLQPSSVSSMDQGKVSSVFYTTVVP

ML" (SEQ ID NO:305).

BASE COUNT 101 a 138 c 87 g 161 t

ORIGIN

1 cattgccatc tgtagccct tctgtacaa tgtcatcatg tcctatcact tctgctccg

61 gctcacagtg ggagtttaca ttttaggcat ccttgatct acaattcaca ccagctctat

121 gttgagactc ttctgtgca aaactaatgt gattaacat tattttgtg atctctccc

181 tctcttgga cttctctgct ccagtaccta catcaatgaa ttactagttc tggcttgag

241 tgcattgaat atctcgacgc ctgcctaac tatcctggcc tctatatct tcaccattgc

301 cagtatctc cacattcgt ccaactgagg caggtccaaa gccttcagca ctgcagctc

361 ccacatctca gctgttgctg tctctttgg atctgcagca ttcattgacc tgcagccatc

421 atctgtcagt tccatggacc aggggaaagt gtcattctg ttttacacaa ctgttggtcc

481 catgctg (SEQ ID NO:306).

OR188

LOCUS AF179809 469 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA199) gene, partial cds.

ACCESSION AF179809

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 469)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 469)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..469

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>469
 /gene="CJA199"
 CDS <1..>469
 /gene="CJA199"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTTVMSRGLCCVLVAASWMGGFVHSTVQTILTIRLP
 FCGPNQVDNFFCDVPPVIKLACADTFVIELLMVSNGLISTSSFVVLISYTTILVKI
 HSKEGRRKALSTCASHLMVVTLFGPCSFYHPFSTFSVDKMVSVLYKVITPML" (SEQ ID

NO:307).

BASE COUNT 91 a 126 c 97 g 155 t

ORIGIN

1 tgttgctatc tgcaccccc tgcactacac cactgtcatg agtcggggat tatgctgtgt
 61 gttggttgc gcctcctgga tgggaggatt tgtgcactcc accgtccaga ccattctcac
 121 tatccgtctg ccttttctg ggccaaatca ggtggacaac ttttttctg atgtccccc
 181 tgtcatcaaa ctgacctgtg ctgacacttt tgcattgaa ttgctcatgg tatctaacag
 241 tgggttgatc tccaccagct cctttgtggt gctgatttcc tctacacca ctatctagt
 301 caagattcac tccaaggagg gaaggcgaaa ggcacttccc acatgtgect ctacattat
 361 ggtgtaaca ctttttgac cctgtagttt catctatct catccttct ctacatttc
 421 tgtggacaag atggtgtctg tactctacaa ggttattact ccaatgcta (SEQ ID NO:308).

OR189

LOCUS AF179810 488 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA201) gene, partial cds.

ACCESSION AF179810

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>488

/gene="CJA201"

CDS <1..>488

/gene="CJA201"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLRYMLLSHSICVTMIIVCWSISIAGALILTVFTMHLP

YCGPYKINHFFCEVPAVLKLACADTSFNDRDLFILGFILLVPLSLILASYVFIFASI

FRIRSAQGRLKSFSTCASHVTVVTMFYGPAILMYMRPGSWYDPERDKKLALFYNVVSG

FL" (SEQ ID NO:309).
 BASE COUNT 84 a 145 c 105 g 154 t
 ORIGIN

1 cgttgccatt tgcttcccc ttcgctatat gctactcatg agccattcca ttgtgtcac
 5 61 gatgattata gttgttggc ccattagcat agctggggcc ctgacctca ctgtcttcac
 121 catgcatctg ccttattgtg gccctacaa gataaaccac ttctctgtg aggtccctgc
 181 tgtcctgaag ttggcctgtg cagacacatc tttaatgac aggctggact tcatttggg
 241 ttctactctg ctttgggtcc cactctccct catcctggcc tcttacgtct tcattttgc
 301 ctctatcttc agaatccgct cagcgcaggg gaggtcaag tcttctcca cgtgtgcttc
 10 361 ccacgtcact gtgtgcacca tgttctatgg gccggccatc atcatgtaca tgaggcccgg
 421 ttcttggtat gaccagagc gggacaagaa gctagcgtg ttctacaatg tggctctctgg
 481 cttctca (SEQ ID NO:310).

OR190

15 LOCUS AF179811 487 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA202) gene, partial cds.
 ACCESSION AF179811
 KEYWORDS .
 20 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 487)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 35 source 1..487
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>487
 /gene="CJA202"
 40 CDS <1..>487
 /gene="CJA202"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLRYTATMNLRLCVQLVAGLWLVTYLHALLHTSLIAHLS
 45 FCAFNIHHFFCDLNPLLRLSCSAVSFNVMIIFAVGGLLALTPLVCILVFYGLIFSTV
 LKITSTQGKQRAASTCGCHLSVVVLFYGTIAIVYFSPSSHTPESDTLSTVMYSVVP
 ML" (SEQ ID NO:311).

BASE COUNT 86 a 152 c 94 g 155 t
 ORIGIN

50 1 tgtggcaatt tgccaccctc tacgttacac tgccacaatg aacctgcgcc ttgtgtcca
 61 gctagtggct ggactgtggc ttgtactta cctccatgcc ctctgcata ctcccta
 121 agcacatctg tccttctgtg ccttcaatat catccatcat ttctctgtg atctcaaccc
 181 tctactacgg ctctcttgcg ctgccgtctc ctcaacgta atgatcatt ttgcagtagg
 241 aggtctattg gctctcagc cccctgtctg tctctcgta tttatggac ttatctctc

301 cactgttctg aagatcacct ctactcaggg gaaacagaga gctgctcca cctgcggctg
 361 ccacctgtca gtagtggtgc tgtttatgg cacagccatt gccgtctact ttagccctc
 421 atctcccat acgctctgaga gtgacctct ctgaccgtc atgtattcag tggtgccccc
 481 gatgctg (SEQ ID NO:312).

OR191

LOCUS AF179812 491 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus PPY110 pseudogene, partial sequence.
 10 ACCESSION AF179812
 KEYWORDS .
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 15 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
 REFERENCE 1 (bases 1 to 491)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 20 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 491)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 25 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..491
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 30 gene <1..>491
 /gene="PPY110"
 /pseudo
 BASE COUNT 92 a 118 c 105 g 176 t
 ORIGIN

35 1 cgtggccatc tgtaaccac tgttgtaaac ggtcaccatg tctcccaga tgtgtttgct
 61 ctttcactg ggtgtctatg ggtgggggt tttggggct gtggttcata tgggaaacat
 121 aatgtttatg tcttttttg gagacaacct tgtcaatcac tatctgtgtg acatctctc
 181 tctcctgag ctctcctgca acagctctta cataaattg ctggtgggtt ttattattgt
 241 gaccattggc attgggggtc caattgtcac catitttate tcttatggtt ttattcttc
 40 301 cagcattctc cacattagct cacagagggc aggtcaggtc taaagccttc agtacctgca
 361 gttcccatat aattgtggtc tcgctttct ttgggtcagg tgctttcatg tacctcaaac
 421 caccctctct tctaccctg gaccagggga aagtgcctc catttttat actgctgtgg
 481 tgcccatgtt t (SEQ ID NO:313).

OR192

LOCUS AF179813 480 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus PPY111 pseudogene, partial sequence.
 50 ACCESSION AF179813
 KEYWORDS .
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
5 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..480
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
15 gene <1..>480
/gene="PPY111"
/pseudo
BASE COUNT 81 a 141 c 100 g 158 t
ORIGIN
20 1 tgtggccatc tgcttcccc tgcactacac catccatcat gagcccatg ctctgtctct
61 cccctttggc gctgtctcgg gtgctgacca cttccatgc catgttacac actttactca
121 tggccaggtt gtgttttgt gcagacaatg tgatcccca cttttctgt gatatgtctg
181 ctctgtgaa gctgtcctgc tctgacactc gagtaatga attggtgata ttatcatgg
241 gagggctcat tctgtcatc ccattcctac tcaccttgg gtcctatgca cgaattgtct
25 301 cctccatcct caaggtccct tctaagggtg tctgaaggc ctctctact tgtggctccc
361 acctctctgt ggtgtccctg ttcatggga ccgtagtggt tcttactta tgcccatcgg
421 ctaatagtc tactctgaag gagactgtca tggctgtaat gtacactgtg gtgaccccca (SEQ ID NO:314).

OR193

30 LOCUS AF179814 486 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY112) gene, partial cds.
ACCESSION AF179814
KEYWORDS .
35 SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 486)
40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
45 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
50 source 1..486
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>486
/gene="PPY112"

CDS <1..>486
 /gene="PPY112"
 /codon_start=1
 /product="olfactory receptor"
 /translation="CAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLARLS
 FCADHIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 ML" (SEQ ID NO:315).

BASE COUNT 96 a 147 c 93 g 150 t

ORIGIN

1 tgtgccaatc gtcacccctc acattatgcc accatcatga gtcagagcca gtgtgtcatg
 61 ctggtggctg ggtcctgggt catcgcttgt gcgtgtgctc ttgtcatac cctcctctg
 121 gcccggttt ccttctgtgc tgaccacatc atctctcact tcttctgtga ccttggtgcc
 181 ctgctcaagc tgcctgtgc agacacctcc ctcaatcagt tagcaatctt tacagcagga
 241 ttgacagcca tatgcttcc attcctgtgc atcctggttt cttatggta cattggggtc
 301 accatcctcc agatccctc caccaagggc atatgcaaag ccttggtccac ttgtggatcc
 361 cactctcag tggtagctat ctattatggg acaattattg gtctctattt tctaccccca
 421 tccagcaaca ccaatgacaa gaacataatt gcttcagtga tatacacagt agtcactccc
 481 atgttg (SEQ ID NO:316).

OR194

LOCUS AF179815 487 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus PPY113 pseudogene, partial sequence.

ACCESSION AF179815

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>487

/gene="PPY113"

/pseudo

BASE COUNT 107 a 130 c 95 g 155 t

ORIGIN

1 cactgccatt tgccaccctc taagataaac caatctcatg agacccaaaa ttgtggact
 61 tatgactgcc ttctcctgga tctcgggctc tacggatgga atcattgatg ctgcagcgac
 121 atttctctc tctactgtg ggtctcggga aatagccac ttctctgtg agttccctc
 181 catactaate ctctcatgca atgacacatc aatattgaa aaggttctt tcatctgctg
 241 tatagtaatg attgttttct ctgttgcaat catcatcgct tctatgctc aagtattct

301 ggctgtcatt cacatgggat ctggagaggg tcgtcggata gctttcacga cctgttctc
 361 tcacctcatg gtggtgggaa tgtactatgg agcagctttg ttcattgaca tacggcccac
 421 atctgatgc tccctacac aggacaagat ggtgtctgta ttctacacca tctcactcc
 481 catgctg (SEQ ID NO:317).

OR195

LOCUS AF179816 484 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus olfactory receptor (PPY114) gene, partial cds.

ACCESSION AF179816

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>484

/gene="PPY114"

CDS <1..>484

/gene="PPY114"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLSLVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFFCDMSALLKLSCSDTRVNELVIFIMGGLILVIPFLILGSYARIVSSI

LKVPSKGICKAFSTCGSHLSVVSIFYGTVSGLYLCPANSSTLKETVMAVMYTVVTPM

L" (SEQ ID NO:318).

BASE COUNT 80 a 142 c 105 g 157 t

ORIGIN

1 tgtggccatc tgcttcccc tgcactacac cgccatcatg agcccatgc tctgtctctc

61 cctggtggcg ctgtcctggg tgctgaccac ctccatgcc atgttacaca ctttactcat

121 ggccaggttg tgttttggc cagacaatgt gatccccac ttttctgtg atatgtctgc

181 tctgtcgaag ctgtcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg

241 agggctcatt ctgtcatcc cattctact catccttggg tctatgcac gaattgtctc

301 ctccatctc aaggtccctt ctaagggtat ctgcaaggcc ttctctactt gtggtccca

361 cctctctgtg gtgtccctgt tctatgggac cgtagtggt ctctactt gcccacggc

421 taatagtct actctgaagg agactgtcat ggctgtaatg tacactgtgg tgacccccat

481 gctg (SEQ ID NO:319).

OR196

LOCUS AF179817 483 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY115) gene, partial cds.

ACCESSION AF179817

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 483)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 483)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..483

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>483

/gene="PPY115"

CDS <1..>483

/gene="PPY115"

/codon_start=1

/product="olfactory receptor"

/translation="VAVCHPLHYTLIMHGGLCLGLVAGCLVAGFMNSLMETIITFQLL

LCHNVINHFACE TLAVRLACVDVSFNKAMVAISGFLVILLPCSLILFSYAHIVAAIL

HIPSAQGRRKAFGTCTSHLTVVCMCFGATMFTYMRPAGGSSLEKKNMVALFYAIVIPM

L" (SEQ ID NO:320).

BASE COUNT 86 a 136 c 115 g 146 t

ORIGIN

1 gtggccgtct gccaccact gcattacacg ctcacatgc atggagggct gtgcctgggg

61 ctggtggccg gctgcctggt ggctggttc atgaattccc tgaaggaaac aattatcacc

121 ttccagcttc tctgtgtca caatgttatt aatcactttg cctgtgagac ctagcagtg

181 ctacgactag cctgtgtgga cgtctcctc aacaaggcca tggaggccat ctcagggtt

241 ctggtgatcc tgcttccctg ttcactgatc ctattctct atgctcacat agttgctgcc

301 attctcata ttcttctgc ccaggggacgc cgcaaagcct tggggacttg cacgtctcac

361 ctactgtgg ttgcatgtg cttgggggct acaatgttca cctacatgag acctgcgggc

421 ggctctccc tggaaaagaa gaatatggt gccctcttt atgccattgt gattccaatg

481 ctt (SEQ ID NO:321).

OR197

LOCUS AF179818 484 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY116) gene, partial cds.

ACCESSION AF179818

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

15 /organism="Pongo pygmaeus"
/db_xref="taxon:9600"

gene <1..>484
/gene="PPY116"

CDS <1..>484

20 /gene="PPY116"
/codon_start=2

/product="olfactory receptor"
/translation="VAVCHPLHYTLIMHGGLCLGLVAGCLVAGFMNSLMETIITFQLP

25 LCHNVINHAFACETLAVLRLACVDVSFNKATVAISGFLVILLPCSLILFSYAHIVAAIL

RIPSAQGHRKAFGTCTSHLTVVCMCFGATMFTYMRPAGGSLEKENMVALFYAIVIPM
L" (SEQ ID NO:322).

BASE COUNT 85 a 138 c 116 g 145 t

ORIGIN

30 1 ttgtggccgctc tgccaccac tgcatcac gctcatcatg catggagggc tgtgcctggg

61 gctggtggcc ggctgcctgg tggctggtt catgaattcc ctgatggaaa caattatcac

121 ctccagctt cccctgtgtc acaatgttat taatcacttt gcctgtgaga ccttagcagt

181 gctacgacta gctgtgtgg acgtctcctt caacaaggcc acggtggcca tctcagggtt

241 tctggtgac ctgcttcct gttcactgat cctattctcc tatgtcaca tagttgctgc

35 301 cattcttctg attccttctg cccagggaca ccgcaaagcc ttgggacct gcacgtctca

361 cctcactgtg gtttcatgt gctttggggc tacaatgttc acctacatga gacctgcggg

421 tggctcctcc ctggaaaagg agaatatgtt tgccctcttt tatgccattg tgattccaat

481 gctt (SEQ ID NO:323).

OR198

40

LOCUS AF179819 479 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus PPY117 pseudogene, partial sequence.

ACCESSION AF179819

KEYWORDS .

45 SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 479)

50 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 479)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..479
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>479
 /gene="PPY117"
 /pseudo

BASE COUNT 100 a 115 c 91 g 173 t

ORIGIN

1 ttagccata tgcaaacct tatactatgt ggtcatcatg agccgaagga cacgcactgt
 61 ctggtaatg atctcctggg ctgtgggctt ggtgcacaca ttaagccagt tatcattac
 121 tgtgaacctg cctttttgt ggacctaag tagtagacag cttttttgt gatcttctc
 181 gtagtacc aaactgcctgc ctggactctt acctcattga aatactaatt gtggtcaata
 241 gtggagtct ttcctaagc actttctgtc tcttggtcag ctctacac attattcttg
 301 ttatggttg gctcaagctc tggcctgcaa tggcgaaggc atttctacg ctggcttccc
 361 atattgcagt agtaataata ttcttggac ctgcatctt catctatgtg tggcccttta
 421 ccatctatcc ttgtgataaa ctcttgcca tattttacac tgtttcacc cccatccta (SEQ ID NO:324).

OR199

25 LOCUS AF179820 487 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus olfactory receptor (PPY118) gene, partial cds.
 ACCESSION AF179820
 KEYWORDS
 SOURCE orangutan.

30 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>487
 /gene="PPY118"
 CDS <1..>487
 /gene="PPY118"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLARLS
 FCADHIIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI

LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:325).

BASE COUNT 95 a 147 c 94 g 151 t
ORIGIN

5 1 tgtggccatc tgtcacccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgggtggct gggctcctggg tcacgccttg tgcgtgtgct cttttgcata ccctccttct
121 ggcccggtt tccttctgtg ctgaccacat catctctcac ttcttctgtg acctgggtgc
181 cctgtctcaag ctgtctgtc cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattcctgtg catcctgggt tcttatgggc acattggggg
10 301 caccatcctc cagattccct ccaccaaggg catatgcaa gcctgtcca cttgtggatc
361 ccacctctca gtgggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:326).

15 **OR200**

LOCUS AF179821 475 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY119 pseudogene, partial sequence.
ACCESSION AF179821

20 **KEYWORDS**

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

25 **REFERENCE** 1 (bases 1 to 475)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 **REFERENCE** 2 (bases 1 to 475)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 **FEATURES** Location/Qualifiers

source 1..475

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>475

40 /gene="PPY119"

/pseudo

BASE COUNT 98 a 119 c 104 g 154 t

ORIGIN

45 1 gtagccataa gcaaacctct ccactatgca atcatcatga actcatgcac atgtacaggc
61 ccagtggtag gctcttgggt cattgggggt atgcactccc tgagccagtt agctttcact
121 gtaagcttgc ccttctgtgg cccaacata gtggacagtt attattgcga ccttactttg
181 gtcacaaac gtgcctgtac agatgcttat atccctgaag tttgatgct ttggacgggt
241 ggtcttatgg ggggtaccat tttgctttt gctgatctcc tacacgttca ttctgattac
301 tgtgcagcga cattcctcag caggatatgc caaggctcac agcactctga ctgccacat
50 361 tgctgtgggt accgtgttct ttgggcctg tatcttcac tatgcctggc ctttcagcaa
421 cttaccagt gataacattt tgctgtatt ctctgtatt ttacaccta tatta (SEQ ID NO:327).

OR201

LOCUS AF179822 487 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY120) gene, partial cds.

ACCESSION AF179822

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>487

/gene="PPY120"

CDS <1..>487

/gene="PPY120"

/codon_start=2

/product="olfactory receptor"

/translation="VAICHPLHYATTMSQSQCVMVLVAGSWVIACACALLHTLLLARLS

FCADHIIPHFFCDL GALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI

LQIPSTKGICKALSTCGSHLSVVVTIYYGTIIGLYFLPSSNTNDKNIIASVIYTVVTP

ML" (SEQ ID NO:328).

BASE COUNT 95 a 150 c 94 g 148 t

ORIGIN

1 tgtggccatc tgtcaccctc tacattatgc caccacatg agtcagagcc agtgtgtcat

61 gctggtggct gggctctggg tcacgcttg tgcgtgtgct ctttgcata ccctcttct

121 ggccccggtt tccttctgtg ctgaccacat catccctcac ttcttctgcg acctggtgc

181 cctgctcaag ctgtctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg

241 attgacagcc attatgcttc cattctgtg catcctggtt tcttatggtc acattggggt

301 caccatcctc cagattccct ccaccaaggg catatgcaaa gccttggtcca ctgtggatc

361 ccaccttca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc

421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc

481 catgttg (SEQ ID NO:329).

OR202

LOCUS AF179823 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC184) gene, partial cds.

ACCESSION AF179823

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC184"
CDS <1..>487
20 /gene="SSC184"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLP
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
25 LRPVSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:330).

BASE COUNT 88 a 142 c 106 g 151 t
ORIGIN
1 tgttgccata tgttaccctc tccactacac tgccatcatg aggggaagggc tctgtgcctt
30 61 cttagtggtc gtatcttgga ttcatcttg tgctagctcc ctcttcaca ccttctgct
121 gacccectg cctttctgtg atgcaaacac cgtccaccac ttctctgtg acctgtgctc
181 cctgtcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc catcatgtg tatcctggtg tcatatggct acactggggc
301 cactatcctg aggggtccct caaccaaagg gatccgcaaa gcgtgtgcca tgtgtggctc
35 361 ccgtctctct gtggtgtctc tgtattatgg ctcaatatit ggccagtacc ttttccaac
421 tgaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc
481 catgctg (SEQ ID NO:331).

OR203

40 LOCUS AF179824 488 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC185) gene, partial cds.
ACCESSION AF179824
KEYWORDS .
45 SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 488)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..488

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

10 gene <1..>488

/gene="SSC185"

CDS <1..>488

/gene="SSC185"

/codon_start=2

/product="olfactory receptor"

15 /translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS

FCDANTVHHYFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI

LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP

ML" (SEQ ID NO:332).

BASE COUNT 89 a 142 c 106 g 151 t

20 ORIGIN

1 ttgtgccata tgtaccctc tccactacac tgccatcatg aggggaagggc tctgtgcctt

61 cttagtggct gtatcttga tccatcttg tgctagctcc ctctctaca cccttctgct

121 gaccccgctg tcttctgtg atgcaaacac cgtccaccac tacttctgtg acctgtgctgc

181 cctgtccaag ctgtctgct cagatatctt cctcaacgag ctggtcatgt tcacagtagg

25 241 ggtggtgggc attaccctgc cattcatgtg tctcctggta tcatatggct aactgggggc

301 cactatcctg aggggtccct caaccaaagg gatccgcaa gcggtgtcca tgtgtggctc

361 ccgtctctct gtgtgtctc tgtattatgg ctcaatatt gccagtagc ttccccaac

421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc

30 481 catgctgt (SEQ ID NO:333).

OR204

LOCUS AF179825 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC186) gene, partial cds.

35 ACCESSION AF179825

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487
 /gene="SSC186"
 CDS <1..>487
 /gene="SSC186"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VATCHPLRYMVIMNPCLCSLLILLSPLTSVVNALLLSLMVLRSL
 FCTDLEIPLFFCELAQVIQLACSDTLINNILIYFAACIFGGVPLSGIIFSQAQIASSI
 LRMPASARRKYKAFSTCGSHLSMVLLFYRTGLGVYISSAVTDSPRKTAVASMMYSVGPQ
 MV" (SEQ ID NO:334).
 BASE COUNT 92 a 126 c 105 g 164 t
 ORIGIN

1 tgtggccact tgcaccccc ttagatacat ggtcatcatg aaccctgcc tctgcagcct
 61 gctgattctt cttctccgt tgactagcgt tggtaagcc cttcttca gcctgatggt
 121 gttgaggctg tcctctgca cagatctgga aatcccgctc ttctctgtg aactggctca
 181 ggcatccag ctgctgtgt ctgacaccct catcaataac atcctgatat atttgcagc
 241 ttgcatattt ggtggtgtc ctctgtctgg aatcatattc tctatgctc agattgcctc
 301 ctctattttg agaatgccat cagcacgcag aaagtataaa gcctttcca cctgtgggtc
 361 tcacctctcc atgtgtctct tttctatag gacagggttg ggggtgtaca ttagttctgc
 421 agttactgac tcacctagga agactgcagt ggctcaatg atgtattctg tgggtcctca
 481 aatggtg (SEQ ID NO:335).

OR205

LOCUS AF179826 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri sciureus olfactory receptor (SSC187) gene, partial cds.
 ACCESSION AF179826
 KEYWORDS .
 SOURCE common squirrel monkey.
 ORGANISM Saimiri sciureus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri sciureus"
 /db_xref="taxon:9521"
 gene <1..>487
 /gene="SSC187"
 CDS <1..>487
 /gene="SSC187"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLMARLR
 FCADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLIIGSYARIVFSI

LKVPSSKGICKAVSTCGSHLSVVSFLFYGTVIGLYLCPSANNSTLKETVMAVMYTVMAP
ML" (SEQ ID NO:336).

BASE COUNT 84 a 140 c 104 g 159 t
ORIGIN

5 1 cgtggccatc tgcctcccc tacattacgc caccatcatg agcccatgc tgtctcgtc
61 cctgggtggc ctgtctggg tgctgaccac ctccatgcc atgtgcaca cttactcat
121 ggccagggtg cgttttgg cagacaatgt gatcctccac ttttctgtg atatgtctg
181 tctgctgaag ctggcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg
241 aggcctcatt ctgtcatcc catttctact tatcattggg tctacgcac gaattgtctt
10 301 ctccatcctc aaggtccctt ctctaaggg tatctgcaag gccgtctcta ctgtggctc
361 ccacctctct gtggtgtcac tgtctatgg gactgttatt ggtctctact tatgcccac
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgaatggccc
481 catgctg (SEQ ID NO:337).

15 **OR206**

LOCUS AF179827 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC190) gene, partial cds.
ACCESSION AF179827

20 **KEYWORDS**

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

25 **REFERENCE 1** (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 **REFERENCE 2** (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 **FEATURES** Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487

40 /gene="SSC190"

CDS <1..>487

/gene="SSC190"

/codon_start=2

/product="olfactory receptor"

45 /translation="VAICKPLHYTTIMSSKICQLVLGCWVLGFLIIFPPLLGLNLD

FCASNVDHFYFDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVIISYTYIALTI

LKIPSTSQRKKAFTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSKGISVLNTSVAP

LL" (SEQ ID NO:338).

BASE COUNT 112 a 124 c 91 g 160 t

50 **ORIGIN**

1 tgtggccatc tgaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gcttgtgctt ggggtgctggg ttcttggtt tctcatcacc ttccaccac tctcttagg
121 actaaatctt gactctgtg cctccaacgt cggtgatcat ttctactttg acactatccc
181 gctcctgcag atttctgca cagacacgca gctcctggag aggatgggat tcactcagc

241 gttggtgaca ctcttagtca cattggtaat ggtgataata tcatatactt atattgccct
 301 gacaattcta aaaatccctt caactagtca gaggaaaaag gcttttcca cgtgttcttc
 361 tcacatgatt gtgatatccc ttcttatgg cagctgcac ttcatgtatg ttaagccatc
 421 agtcaaacaa agggatatct ttcaaaggg aatttcggtg ctcaatacct ctgttgctcc
 481 acttttg (SEQ ID NO:339).

OR207

LOCUS AF179828 485 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC191) gene, partial cds.

ACCESSION AF179828

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>485

/gene="SSC191"

CDS <1..>485

/gene="SSC191"

/codon_start=1

/product="olfactory receptor"

/translation="VAICHPLQYSVIMTTGYCGQLVAFSYMSGFMISVIKVVYFISHVA

FCGSNVMNHFFCDISPVLKLACKDMSTAELVDFALAIVILVIPLITLTSYIYIVSAI

LHIPSTQGRKKAFSTCASHLTVVIIIFYTAMIFTYVRPRAIASFNSNKLMSAVYAVLTP

ML" (SEQ ID NO:340).

BASE COUNT 111 a 134 c 80 g 160 t

ORIGIN

1 gtggccattt gccaccctct tcaatactca gtcacatga ccacaggta ctgtggacag

61 ctgttggtct tctttacat gagtggttc atgatctctg tcatcaaggc ctatttcatt

121 tcacatgttg ctttctgtgg ctccaatgtt atgaaccact ttttctgtga tatctacca

181 gtctctaaac tggcatgcaa agacatgtcc acagctgagc tagtggactt tgcttagct

241 atcgtcatc ttgtgatccc tctcattacc actatctctt cctatatcta cattgtctcc

301 gccattctgc atataccctc caccaggga aggaagaagg ccttctccac ctgtgcatct

361 caccctactg tagtcataat ttttacaca gccatgatt ttacatagt tcggcccaga

421 gctattgcat catttaattc caacaacta atgtcagctg tgtatgcagt cctcacacc

481 atgct (SEQ ID NO:341).

OR208

LOCUS AF179829 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC192) gene, partial cds.

ACCESSION AF179829

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487

/gene="SSC192"

CDS <1..>487

/gene="SSC192"

/codon_start=2

/product="olfactory receptor"

/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS

FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMCILVSYGYTGATI

LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSIDKDVIVALMYTVVTP

ML" (SEQ ID NO:342).

BASE COUNT 88 a 141 c 106 g 152 t

ORIGIN

1 tgttgccata tgttacccctc tcactacac tgccatcatg aggggaagggc tctgtgcctt

61 cttagtggct gtatcttggg ttccatcttg tgctagctcc ctctctcaca cccctctgct

121 gaccccgctg tctttctgtg atgcaaacac cgtccaccac ttctctgtg accttgctgc

181 cctgctcaag ctgtctctct cagatatctt cctcaatgag ctggctcatg tcacagtagg

241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct aacttggggc

301 cactatcctg aggggtccctt caaccaaagg gatccgcaaa gcgttgcca tgtgtggctc

361 ccgtctctct gtgtgtgtctc tgtattatgg ctcaatattt ggccagtacc ttttccaac

421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc

481 catgctg (SEQ ID NO:343).

OR209

LOCUS AF179830 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC193) gene, partial cds.

ACCESSION AF179830

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC193"
CDS <1..>487
20 /gene="SSC193"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
25 LRPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSIDKDVIVALTYTVVTP
ML" (SEQ ID NO:344).

BASE COUNT 88 a 143 c 106 g 150 t
ORIGIN
1 tgttgccata tgttacccctc tccactacac tgccatcatg agggaagggc tctgtgcctt
30 61 cttagtggct gtatcttggga ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gacccecgctg tctttctgtg atgcaaacac cgteccaccac ttctctgtg accttgctgc
181 cctgctcaag ctgtctctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggctc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatectg aggggtccctt caaccaaagg gatccgcaaa gcgttgcca tgtgtggctc
35 361 ccgtctctct gtggtgtctc tgtattatgg ctcaatatgt ggccagtacc ttttccaac
421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta acgtacacag tggtcacacc
481 catgctg (SEQ ID NO:345).

OR210

40 LOCUS AF179831 486 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC194) gene, partial cds.
ACCESSION AF179831
KEYWORDS .

45 SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..486

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

10 gene <1..>486

/gene="SSC194"

CDS <1..>486

/gene="SSC194"

/codon_start=2

/product="olfactory receptor"

15 /translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS

FCTDLEIPHFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSI

RAISSAQKGYKAFSTCASHILIVSLFYGTLLGVYISSAATGNSHSSAAALVMYTVVTP

ML" (SEQ ID NO:346).

BASE COUNT 102 a 133 c 97 g 154 t

20 ORIGIN

1 tgtggccatc tgcaccccc tgcactacac agtcaccatt aaccccagac tgtgtggact

61 gctggtctg gcactctgga tctgagtg cctgaattcc tcattacaaa ccttaatagt

121 gctgcggctt tcctctgca cagactgga aatccccac ttttctgcg aactaatca

181 ggcatcacat ctgcctgtt atgacacttt ccttaatgat gtggtgatgt attggcagc

25 241 tatgtctctg ggcgggtg cctcacagg aattatttac tctactcta agatagtttc

301 ctccatacgt gcaatctcat cagctcaggg gaagtacaag gcgtttcca cctgtgcac

361 tcacatctta attgtctct tatttatgg tacactccta ggtgtgtaca ttagttctgc

421 tgcaactggc aatcacatt caagtctgc agccttggtg atgtacactg tggtcacccc

481 catgct (SEQ ID NO:347).

OR211

LOCUS AF179832 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC195) gene, partial cds.

35 ACCESSION AF179832

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487
 /gene="SSC195"
 CDS <1..>487
 /gene="SSC195"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHMGNIMFMT
 FCSENLVNHVMCDVLPLELSCNSSYINLLLVFIIVAIGIGVPIVTIFISYGFILSSI
 LHISSTEGRSKAFSTCSSHIIIVSLFFGSGAFMYLKPPSILPLDQGVSSIFYTAVVP
 MF" (SEQ ID NO:348).

BASE COUNT 92 a 116 c 105 g 174 t
 ORIGIN

1 cgtggccatc tgtaaccac tgctgtacat ggccaccatg tctcccagg tgtgcttgct
 61 cctttgttg ggtgtctatg ggatgggggt ttgggggct gtggctcata tgggaacat
 121 aatgtttatg accctttgtt cagaaaaatc tgtcaatcac tacatgtgtg atgtccttcc
 181 cctccttgag ctctcctgca acagctctta cataaattg ctgttggtt ttattattgt
 241 ggccattggc attgggggtgc caattgtcac cattttatc tcttatggtt ttattcttcc
 301 cagcattctc cacattagct ccacagaggg cagggtctaa gccttcagta cctgcagctc
 361 ccacataatt gtggatgcgc tttctttgg gtcaggagct ttatgtacc tcaaaccacc
 421 ttctattcta ccctgggacc aggggaaagt gtcttcatt ttatatactg cagtgggtgcc
 481 catgttt (SEQ ID NO:349).

OR212

LOCUS AF179833 486 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri boliviensis SBO213 pseudogene, partial sequence.
 ACCESSION AF179833
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..486
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>486
 /gene="SBO213"
 /pseudo

BASE COUNT 107 a 151 c 87 g 141 t
 ORIGIN

1 cgtggccatc tgccaccctc tccactatcc catccgcatg agtagaagtg tgtgtgtgaa
 61 gatgattgga ggctcttgga cgctggggtc catcaactcc ttggcacaca cagtctatgc
 121 cctccatatt ccctactgca ggtctagagc cattgacat ttctctgcg acatcccagc

181 catgttgctt ctgcctgta cggacacttg ggtctatgaa tacatggttt ttctaagtac
 241 aagctgcctt ctctctttt ttctctggc atcaccgctt cctatggccg agtcttatt
 301 gctgtctacc atacgcattc aaaaaaggga agaaaaagg cctccaccac cattcaacc
 361 catttaactg tagtgatctt ttactatgca cctttgtct acacatatct tcggcccagg
 421 aatctccact caccatccga agacaagatc ctggcagtct tctacacat ccttaccct
 481 atgctc (SEQ ID NO:350).

OR213

LOCUS AF179834 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO214) gene, partial cds.
 ACCESSION AF179834
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>487
 /gene="SBO214"
 CDS <1..>487
 /gene="SBO214"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTTIMSSKICLQLVLGCWVLGFLIIFPPLLGLNLD
 FCASNVVDHFYCDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVIISYTYIALTI
 LKIPSTSQRKKAFSTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSGISVLNTSVAP
 LL" (SEQ ID NO:351).
 BASE COUNT 112 a 125 c 92 g 158 t
 ORIGIN
 1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
 61 gcttgtgctt ggggtctggg ttcttggtt tctcatcacc ttccaccac tctcttagg
 121 actaaatctt gactctgtg cctccaacgt cgttgatcat ttctactgtg acactatccc
 181 gctcctgcag atttctgtca cagacacgca gtcctggag aggatgggat tcatctcagc
 241 gctggtgaca ctctagtca cattggtaat ggtgataata tcatatactt atattgcct
 301 gacaattcta aaaatccct caactagtca gaggaanaag gcttttcca cgtgttcttc
 361 tcatatgatt gtgatatccc ttcttatgg cagctgcac tcatgtatg ttaagccatc
 421 agtcaaacaa agggatatct ttcaaaagg aatttcggtg ctcaatacct ctgttgctcc
 481 acttttg (SEQ ID NO:352).

OR214

LOCUS AF179835 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri boliviensis olfactory receptor (SBO215) gene, partial cds.

ACCESSION AF179835

KEYWORDS .

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

gene <1..>487

/gene="SBO215"

CDS <1..>487

/gene="SBO215"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTLLMSHSICVNTVIVCWSISIAGALIYTVFTLHLP

YCGPYKINHFFCEVPAVLKLACADTSFNDRLDFILGFLLLVPLSFILASYVLIFASI

FRIRSVQGRLKSFSTCASHVTVTMFYGPAILMYMRPGSWYDPEWDKKVEVLNVISA
FL" (SEQ ID NO:353).

BASE COUNT 86 a 142 c 104 g 155 t

ORIGIN

1 cgttgccatt tgcttcccc ttactatac gctactcatg agccattcca ttgtgtcaa

61 cacggtcatt gtctgttggt ccattagcat agctggggcc ctgatctaca ctgtcttcac

121 ctgcatctg ccttattgtg gccctacaa gataaaccac ttctctgtg aggtccctgc

181 tgtcctgaag ttggcctgtg cagacacatc tttaatgac aggctggact tcattttggg

241 ttctctctg cttttgttc cactctcct catcctggcc tctacgtac tcactttgc

301 ctctatcttc agaatccgct cagtgcaggg gaggtcaag tcctctcca cgtgtgcttc

361 ccacgtcact gtgtgcacca tgttctacgg accggccatc atcatgtaca tgaggcccgg

421 ttcttggtat gaccagagt gggacaagaa ggtagaggtg ttgtacaatg tcactctgc

481 cttcttg (SEQ ID NO:354).

OR215

LOCUS AF179836 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri boliviensis olfactory receptor (SBO216) gene, partial cds.

ACCESSION AF179836

KEYWORDS .

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO216"
CDS <1..>487
20 /gene="SBO216"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPQACMTMVGTSWLTGIITATTHASLIFSLP
25 FPSHPMIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMVPFSMIVTSYIRILGAI
LAMTSTQSRHKVFSTCSSHLLVVCLFFGTASITYIRPQAGSSVTTDRILSLFYTVITP
ML" (SEQ ID NO:355).
BASE COUNT 93 a 186 c 89 g 119 t
ORIGIN
1 tgttgccatc tgccagcccc tgccactact caccctcttg agccacaggg cctgcatgac
30 61 catgggtgggc acctctctggc tcacaggcat catcacagcc accacccatg cctccctcat
121 cttctctctg ccttccccca gccaccaat gatccacac ttctctgtg acatcctgcc
181 agtactgaga ctggcaagtg ctgggaagca caggagttag atctccgtga tgacagctac
241 cgtagtcttc atcatggtcc ctttctctat gattgtcacc tcttacatcc gcatcctggg
301 tgccatccta gcaatgactt ccaccagag cggccacaag gtcttctcca cctgctcctc
35 361 ccactctgct gtggtctgtc tcttcttgg aacagccagc atcacctaca tacggcccca
421 ggaggtctcc tctgtacca cagaccgcat cctcagttct tctacacgg tcatcacacc
481 catgctc (SEQ ID NO:356).

OR216

40 LOCUS AF179837 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO217) gene, partial cds.
ACCESSION AF179837
KEYWORDS .
45 SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

gene <1..>487

/gene="SBO217"

CDS <1..>487

/gene="SBO217"

/codon_start=2

/product="olfactory receptor"

/translation="VAICHPLYYSTVMSPQVCALILVLCWVLTNVVALTHLLMARLS

FCVTGEIAHFFCDITPVLKLSCDTHNEMMVFLVGGTVLIIPFLCIVTSYIYIVPAI

LRVRTHGGAGKAFSTCSSHLICVCFYGTLFSAYLCPPSIASEDKDIATAAMYTIVTP

TL" (SEQ ID NO:357).

BASE COUNT 89 a 151 c 100 g 147 t

ORIGIN

1 tgtggccatt tgccaccccc tctactactc cacagtcacg agcccccag tctgtgccct

61 aatcctcgtg ttgtgctggg tctcaccac cgttgtgcc ttgaccaca cactcctcat

121 ggctcgactg tcctctgtg tgactgggga aattgctcac ttttctgtg acatcactcc

181 tgtctgaag ctatcatggt ctgacacca catcaatgag atgatggtt ttgtctggg

241 aggacagta ctcacatcc ctttctatg cattgtcacc tcctacatct acattgtgcc

301 tgctattctg agggctccgaa cccatgggtg ggcgggcaag gcctttcca cctgcagttc

361 ccacctctgc attgtttgtg tgttctatgg gaccctctc agtgcctacc tgtgtcctcc

421 ctccatcgcc tctgaagata aggacattgc aacagc:gca atgtatacca tagtgactcc

481 cacgttg (SEQ ID NO:358).

OR217

LOCUS AF179838 486 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri boliviensis olfactory receptor (SBO218) gene, partial cds.

ACCESSION AF179838

KEYWORDS .

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

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gene      <1..>486
          /gene="SBO218"
CDS       <1..>486
          /gene="SBO218"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHMGNIMFMT
          FCSENLVNHYMCDVLPILLESCNSSYINLLLVFIIAIGIGVPIVTIFISYGFILSSI
          LHISSTEGRSKAFSTCSSHIIVVSLEFGSGAFMYLKPPSILPLDQGVSSIFYTAVVP
          C" (SEQ ID NO:359).
BASE COUNT    92 a  114 c  105 g  175 t
ORIGIN
      1 cggtgctatc tgtaaccac tgctgtacat ggtcaccatg tctcccagg tgtgcttgc
     61 ccttttggtt ggtgtctatg ggaatggggg tttgggggct gtggctcata tgggaacat
    121 aatgtttatg acctttgtt cagaaaatct tgtcaatcac tacatgtgtg atgctcttc
    181 cctccttgag ctctctgca acagctctta cataaattg ctgttggtt ttattattg
    241 ggccattggc attgggggtg caattgtcac catittatc tcttatggtt ttattcttc
    301 cagcattctc cacattagct ccacagaggg cagggtctaa gccttcagta cctgcagct
    361 cacataatt gtggtatcgc tttctttgg gtcaggagct ttatgtacc tcaaacacc
    421 ttctattca cccctggacc aggggaaagt gtctccatt tttatactg cagtgggtgc
    481 atgttt (SEQ ID NO:360).

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OR218

LOCUS AF179839 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO219) gene, partial cds.
ACCESSION AF179839
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO219"
CDS <1..>487
/gene="SBO219"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLQYSVIMTTGYCGQLVAFSYMSGFMISVIKVV
FCGSNVMNLFCDISPVLKLACKDMSTAELVDFALAIIVILVIPLITTT

OR220

LOCUS AF179841 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO221) gene, partial cds.
5 ACCESSION AF179841
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
25 gene <1..>487
/gene="SBO221"
CDS <1..>487
/gene="SBO221"
/codon_start=2
30 /product="olfactory receptor"
/translation="VAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLIARLR
FCADNVIFHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLIIGSYARIVFSI
LKVPSSKGICKAVSTCGSHLSVVSIFYGTVIGLYLCPANNSTLKETVMVAVMYTVMAP
ML" (SEQ ID NO:364).
35 BASE COUNT 85 a 139 c 103 g 160 t
ORIGIN
1 cgtggccatc tgccctcccc tacattacgc caccatcatg agcccatgc tgtctcgtc
61 cctgggtggc gtgtctggg tgctgaccac ctccatgcc atgtgcaca cttactcat
121 agccaggttg cgttttgtg cagacaatgt gatctccac ttttctgtg atatgtctg
40 181 tctgtgaag ctggcctgct ctgacctcg agttaatgaa ttggtgatat ttatcatggg
241 aggcctcatt ctgtcatcc catttctact tatcattggg tctacgcac gaattgtctt
301 ctccatctc aaggctccctt ctctaaggg tatctgcaag gccgtctcta ctgtgggctc
361 ccacctctct gtgtgtgtcac tgtctatgg gactgttatt ggtctctact tatgcccatc
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgatggcccc
45 481 catgctg (SEQ ID NO:365).

OR221

LOCUS AF179842 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Saimiri boliviensis olfactory receptor (SBO222) gene, partial cds.
ACCESSION AF179842
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO222"
CDS <1..>487
20 /gene="SBO222"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHTGNIVFLT
25 FCAGNLVNHYMC DILP LLELSCNGSYINV LVIFIVVTIGIGVPIVAIFISYGFILSSN
LHISAEGRSKAFSTCSSHIIAVSLFFGSGAFMYLKPSSVLPDQGVSSLFYTIVVP
MF" (SEQ ID NO:366).

BASE COUNT 86 a 120 c 105 g 176 t
ORIGIN
1 cgtggccatc tgtaaccac tgctgtacat ggtcaccatg tctcccagg tgtgtttgct
30 61 cctttgttg ggtgtctatg ggaagggggt ttgggggct gtggctcata caggaaatat
121 agtgtttcta acctttttg caggcaacct tgtcaatcac tacatgtgtg acatccttc
181 ccttcttgag ctctcctgca atggctctta cataaatgtt ctgtcatct ttattgttg
241 gaccattggc attgggtgc cattgttgc catcttctc tcttatggtt ttattcttc
301 cagcaatc caccattagt ctgtgaggg caggctctaa gccttcagta cctgcagctc
35 361 ccacataatt gcagtttctc tttcttcgg gtcaggagct ttatgtacc tcaaaccctc
421 ttccgtttta cccttgacc aggggaaagt atcctccctg tttatacta ttgtgtgcc
481 catgttt (SEQ ID NO:367).

OR222

40 LOCUS AF179843 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO223) gene, partial cds.
ACCESSION AF179843
KEYWORDS .

45 SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>487
 /gene="SBO223"
 CDS <1..>487
 /gene="SBO223"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
 15 FCTDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGHYSYSKIVSSI
 RAISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSSHSSAAALVMYTVVTP
 ML" (SEQ ID NO:368).

BASE COUNT 101 a 134 c 98 g 154 t

ORIGIN

1 tgtggccatc tgcaccccc tgactacac agtcaccatt aaccccagac tgtgtggact
 61 gctggttctg gcatcctgga tcctgagtc cctgaattcc tcattacaaa ccttaatagt
 121 gctgcggctt tcctctgca cagacttga aatccccac ttttctgcg aactaatca
 181 ggcatcacat ctgcctggt atgacactt cctaatgat gtggtgatgt atttggcagc
 25 241 tatgtgctg ggcggtggc ccctcacagg aattattac tctactcta agatagtttc
 301 ctccatacgt gcaatctat cagctcaggg gaagtacaag gcgtttcca cctgtgcatc
 361 tcacatctta attgtctct tatttatgg tacactcta ggtgtgtacc ttagtctgc
 421 tgcaactggc aatcacatt caagtctgc agccttggg atgtacactg tggtcacccc
 481 catgctg (SEQ ID NO:369).

OR223

LOCUS AF073959 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR1-72M15 olfactory receptor gene,
 partial cds.

35 ACCESSION AF073959

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 50 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR1-72M15"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="IADIGFTSTTIPKVLQTIHTQSKFISFSGCITQIFFFIVFGCLD
 NLLLSVMA YDRFVAICHPLHYVVMNSCFVMLALGSWIVSVMSSLPETLTVLRLSFC
 TNMEIPHFCDLPEVLKLACSDLVNNIVTYSITIVIAGFPFSGILLSYSKIFSSILR
 IPSAGGKYKAFSTCGSHLLVFLFYSNGLGVYLSSAATSSSRMSLVASLMYSIVTP" (SEQ ID
 NO:370).
 BASE COUNT 139 a 171 c 119 g 220 t
 ORIGIN

1 catagctgac atcggttca cctccaccac tatccccaag gttctgcaga ctatccacac
 61 acagagcaaa ttcatctctt tctcgggctg catcacacag atattttct tcattgtgtt
 121 tggatgcctg gacaatttac tctatcagt gatggcctat gaccgcttg tggccatctg
 181 ccatcccttg cactatgttg tcatcatgaa ttctgtctc tgtgtgatgc tggctcttgg
 241 atcatggata gtcagcgtca tgagttccct acctgagacc ttgactgtgt taagactatc
 301 cttctgtaca aacatggaaa ttccacactt ttctgtgat ctcccgaag tcctgaagct
 361 tgctgttct gacacccttg ttaataacat tgtgacatat tctataacca tagtcatagc
 421 tggtttccca ttctctggga ttctattgtc ttattctaag attttctct ccatcctaag
 481 aattccttca gctgggggca agtacaaagc cttttctacc tgtgggtctc atcttttgg
 541 ggtcttctta ttctatagca atggtcttgg ggtctacctc agctctgcag ccacatcctc
 601 ttctagaatg agtctagtgt cctcactgat gtacagcata gtcactccc (SEQ ID NO:371).

OR224

LOCUS AF073960 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR1-72M16 olfactory receptor gene,
 partial cds.
 ACCESSION AF073960
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR1-72M16"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDFCFSSVTIPKLLQNMQSQVPSIPYAGCLAQMYFFLLFADLE
 SLLVAMAYDRYVAICFPLHYTSIMSPKLCLCLVALSWLLTTVISLSHTLLMARLSFC
 ANNVIPIHFFCDMSALLKLACSDIQINKLMIFILGGLVIIVPFLLIFSSYARIVSSILK
 VPSSRSIRKAFSTCGSHLSVVSFLFYGTIIGLYLRPSANNSTIKETVMAVMYTVVTP" (SEQ ID

NO:372).
 BASE COUNT 129 a 184 c 120 g 216 t
 ORIGIN

1 cttctctgac ttctgctttt cctctgtgac cattcccaaa ttgctgcaga acatgcaaag
 61 ccaagtcca tccatacct atgcagggtg cctggcacia atgtactttt tctgctttt
 121 tgcatatctc gagagcttcc tccttgtggc catggcctat gatcgctatg tggccatctg
 181 ctcccccta cactatacta gcatcatgag cccaagctg tgtctctgcc tgggtggcact
 241 atcttggtga ctgaccacag tcattctttt gtcacacaca ctgctcatgg ctggtgcttc
 301 cttctgtgct aacaatgtga ttctcactt ttctgtgat atgtcagctc ttctgaagtt
 361 agcctgctct gacattcaga tcaataagtt gatgatattt atcttgggag gacttgcatt
 421 tattgtccca ttctgtctga tattttcatc ctatgcacga atagtgtcct ccatttcaa
 481 ggtccctctc tctagaagca tccgcaaggc cttctccacc tgtgtgtccc acctctctgt
 541 ggtgtctctt ttctatggga caatcattgg tctctattta cgtccatcag ctaataattc
 601 aaccattaag gagactgtca tggctgtgat gtacacgggtg gtgaccctc (SEQ ID NO:373).

OR225

LOCUS AF073961 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR10M olfactory receptor gene,
 partial cds.
 ACCESSION AF073961
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,

France
 FEATURES Location/Qualifiers
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 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR10M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
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 SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTFHAMLHTLLMARLSFC
 EDNVIPHFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK
 VPSARGIRKAFSTCGSHLSVVSLFYGAIIGLYLCPADNSTVKETVMAMMYTVVTP" (SEQ ID

NO:374).
 BASE COUNT 120 a 185 c 141 g 203 t
 ORIGIN
 1 cttctctgat cttctctttt cttctgtcac aatgccc aaa ttgctgcaga acatgcagag
 61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtactttt tctgtctctt
 121 tggagacctt gagagcttcc tcttgtggc catggcctat gaccgctatg tggccatctg
 181 ctccccctt cattacatga gcatcatgag ccccgacctc tgtgtgagtc tgggtgtgct
 241 gtctgggtg ctgaccactt tccatgccat gctgcatacc ctgctcatgg ccagattgtc
 301 attctgtgag gacaatgtga tccccactt ttctgtgac atgtctgtct tgcagaagct
 361 gtctgtctt gacactcacg ttaatgaatt ggtgatattt gtcacaggag gcctgatcct
 421 tgcattcca ttgtgtcga tcttgtgtc ctatgcacga attgtgtcct ccattctcaa
 481 ggccccgtct gtcgaggca tccgtaaagc cttctccacc tgtgggtccc acctgtctgt
 541 ggtgtcactg ttctatgggg caatcattgg tctgtactta tgtccatcag ctgataactc
 601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:375).

OR226

35 LOCUS AF073962 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR11M olfactory receptor gene,
 partial cds.
 ACCESSION AF073962
 KEYWORDS .
 40 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 45 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 50 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers
source 1..649
5 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR11M"
mRNA <1..>649
10 /product="olfactory receptor"
CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
15 /translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYGGCLAQIFFFMLFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKVCTFLVLLLWILTPHATMQILLTVRLSFC
ENNVFLNFFCDIFVLLKLACSDTYVNDLMILIMGGLIIVIPFLLIVISYARIISSTLK
VPSTQGIHKVFSTCGSHLSVVSIFYGTIIGLYLCPSGNNFSLKGSAMAMMYTVVTP" (SEQ ID

NO:376).

20 BASE COUNT 143 a 160 c 122 g 224 t

ORIGIN

1 tttctctgac ctctgctttt cctctgtcac aatgccc aaa ttgctgcaga atatgcagag
61 ccaggaccca tccatccct atggagggtg cctggcaca atattcttct ttatgctttt
121 tggagacatg gaaagcttc ttctgttagc catggcctat gaccgctatg tggccatctg
25 181 cttccctctg cattacacta gcatcatgag tctaaggctc tgtacttttc tagtgctact
241 gttgtggata ctgacaacac cacatgccac aatgcaaatt ctgtcacac taagactgtc
301 ttttgtgag aacaatgtgt ttctcaactt ttctgtgac atattgttc tctaaagct
361 ggctgtctca gacacttatg ttaatgattt gatgatactt atcatgggag ggctcatcat
421 tgttattcca ttctgtctca ttgttatatc ctatgcaagg atcatctcct ctactcttaa
30 481 ggttccatct actcaaggca tccacaaggc cttctctacc tgtggctctc atctgtctgt
541 ggtgtctctg ttctatggga caattattgg tctctactta tgtccatcag gtaataattt
601 cagtctaaag gggctctgcc tggctatgat gtacacagtg gtgactccc (SEQ ID NO:377).

OR227

35 LOCUS AF073963 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR12M olfactory receptor gene,
partial cds.

ACCESSION AF073963

40 KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

45 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

50 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

5 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR12M"

10 mRNA <1..>649
 /product="olfactory receptor"

 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNMQSQDTSISYAGCLTQMYFLLVFGDLE
 SILLLVMA YDRYVAVCFPLHYMSIMPTLCVCLLVLSWVFTVLYSMLHTLLSRLSFC
 EDNLIHHFFCDISALLKLACSDIHINELMIFIMGGLVSIIPFLLIVVSYIQIVYSILK
 ISSAHVLHKIFSTCGSHLSVVSIFYGTIFALYLCP SANNSTVKEISMAMMCTVVTP" (SEQ ID

20 NO:378).
 BASE COUNT 134 a 159 c 122 g 234 t
 ORIGIN
 1 cttctctgat ctctgctttt cctctgtcac aatgcccaag ttgtacaga acatgcagag
 61 ccaggacacg tccatctcct atgctggctg tctgacacaa atgtactttt tattggtttt
25 121 tggagacctg gagagcatcc ttcttttggg catggcttat gaccggatg tggtgtctctg
 181 cttccccctt cattacatga gcatcatgag cccacacact tgtgtgtgtc tgctagtgtt
 241 atcctgggta ttactgtgc tgtattctat gtgcacact ctactctgt ctagattgtc
 301 attctgtgag gataactga tccaccactt ttctgtgac atatctgcc tgctcaagtt
 361 ggcttgctct gacattcata ttaatgaatt aatgatatt atcatgggag ggctgttag
30 421 catcatcca ttctactca ttgtgtgtc ctatatacaa attgtctact ccattctaaa
 481 gatttcatct gctcatgttt tacacaagat cttctccacc tgtgggtccc acctgtctgt
 541 agtctcactg tctatggga caattttgc tctctactta tgtccatcag ctaataactc
 601 tactgtgaag gagatttcca tggccatgat gtgcacagtg gtgactccc (SEQ ID NO:379).

OR228

LOCUS AF073964 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M19 olfactory receptor gene,
 partial cds.

40 ACCESSION AF073964
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
45 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

50 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

5 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR15-71M19"
 10 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDIGFISTTIPKMLVNIQTQSKSISYAECITQIYFFMLFGGMD
 15 ILLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLSWFISFSYSLIQSLLMLRLSFC
 TNQIIKHFYCEYSRALTIACSDTLINHILLYILICVLGFIPFSGILYSYCKIVSSILR
 20 IPSTDGKYKAFSTCGSHLSVVSFLFYGTGLGVYLSSDVTSSSGKD VVASVMYTVVTP" (SEQ ID
 NO:380).
 BASE COUNT 153 a 151 c 112 g 233 t
 ORIGIN

1 cttttctgac attggttca tctctacaac tatccctaag atgttggtga atatccaaac
 25 61 acagagcaag tccatctcct atgcagaatg catcaccagc attattttt tcatgctctt
 121 tggaggcatg gacatacttc tctcaccgt gatggcctat gaccgatttg tggccatctg
 181 tcacccctt cactattcag tcattatgaa tccccaacta agtggettgc tggttcttgt
 241 atcatggtt attagctttt catattctct gatacagagt ctattgatgc tgcggttgtc
 301 cttctgtaca aatcagataa ttaaacactt ttactgtgaa tattctagag ccctcactat
 361 agcctgctca gacacactaa tcaatcatat ccttctttat attctgatat gtgtccttgg
 421 cttcatcct ttctcaggga tctttattc atactgaaa attgttctt ctattttgag
 481 aattccatca acagatggaa aatataaagc attttctacc tgtgggtctc atctatcagt
 541 gggtttctta ttctatggga caggccttgg tgtgtacctt agttctgatg taacttcctc
 35 601 ctctgggaag gacgtggtgg cctcagtaat gtatacagtg gtcaccct (SEQ ID NO:381).

OR229

LOCUS AF073965 643 bp DNA ROD 12-JUL-1999
 40 DEFINITION Mus musculus domesticus clone OR15-71M20 olfactory receptor gene,
 partial cds.
 ACCESSION AF073965
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 45 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 643)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 50 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
 source 1..643
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR15-71M20"
 mRNA <1..>643
 /product="olfactory receptor"
 CDS <1..>643
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDLCFSSVTVPKLLKDLSAKKTISIEGCLAQVFFVFFPSGTE
 ACLLSVMAYDRYAAICHPLLYGQVMRNELCVRLVVISWGVASLNATHIIVLLAVNLD
 FCGAQTIIHYTCELPALFPLSCSDISITVVVLLCSSLLHGLGTFIPIFFSYARIVSAILS
 ISSTTGRSKAFSTCSSHLAAVTLFFGSGFLCYLMPPSGSSLDLLSLQYSAVTP" (SEQ ID

NO:382).

BASE COUNT 98 a 203 c 142 g 200 t

ORIGIN

1 gttcgtagat ctctgcttct catccgtcac ggtaccgaaa ctgctgaagg acctctatc
 61 ggcgagaaa accatctcaa tagaaggctg cctggctcag gtctttttg tgtttttcc
 121 ttctggtact gaagcctgcc tgctctctgt catggcttat gaccgctatg ctgccatctg
 181 ccatccctg ctctacggcc aggtgatgag aaatgagtg tgtgtaaggc ttgtggtcat
 241 ctcatggggc gtggcctctc tcaacgcaac catcatctg ctcttggtcg tcaacctgga
 301 cttctgtggg gtcacaacca tcaccacta cacctgtgag ctgctgccc ttteccctt
 361 gtctgttcc gatactcca tcactgtcgt cgtctgctt tgcctcagct tgcgtcatgg
 421 gctgggaacc ttatcccta tcttctctc ctatgccgc attgtctccg ccatcttgag
 481 catcagttcc accaccggga ggagcaaggc cttctccacc tgccttccc acctcgctgc
 541 agtgacctg ttcttgggt ctggctttt ttgctatctc atgcegcct ctggttctc
 601 tctggacttg ctctgtcgt tgcagtacag cgcagtcacg ccc (SEQ ID NO:383).

OR230

LOCUS AF073966 643 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR15-71M21 olfactory receptor gene,
 partial cds.

ACCESSION AF073966

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,

France

FEATURES Location/Qualifiers

source 1..643

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR15-71M21"

mRNA <1..>643

/product="olfactory receptor"

CDS <1..>643

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="LVDIFFSSVTIPKMLANHLLGSKAISFGGCMAMQMYFMISLGNTD

SYILAAAMAYDRAVAISRPLHYATIMSPQLCVLLVAGSWVIANANALPHTLLTARLSFC

GNKDVANFYCDITPLLQLSCSDIRFNVKMMYLGVGVSFVPLLCIIISYVRVFSTVLRV

PSTKGFLKALSTCGSHLTVVSLYYGTVMGMYFRPLTSYSLKHALITVMYTAVTP" (SEQ ID

NO:384).

BASE COUNT 133 a 171 c 148 g 191 t

ORIGIN

1 ccttgttgac atctcttctt cctctgtaac tattcccaag atgctggcca accatctcct

61 aggtagcaag gccatctcct ttgggggatg tatggcacag atgtacttca tgatatcatt

121 gggaacaca gacagtata tactagctgc aatggcatat gaccgagctg tggctatcag

181 tcgcccgtt cattatgcaa caattatgag tccacaactt tgtgtcctgc tgggtgctgg

241 gtctctgggtg attgcaaatg ctaatgcact gcccacacc ctactcacag ctgattgtc

301 ctctgtggc aataaggatg tggccaactt ctactgtgac attacacctt tgcctcagct

361 gtctgtgtt gacatccgct tcaatgtgaa gatgatgtac cttgggggtg gggctctctc

421 tgtgccactg ctgtgcatca tcatctccta tgtccgggtc tttccacag tcttgcgggt

481 tccatctacc aagggtcttc tgaaggcctt gtccacctgt ggctctcacc tgacagtggg

541 gtctgttat tatgggacag tcatgggcat gtatttccgg ccctgacca gttacagtct

601 gaagcatgca ttgataactg tgatgtacac ggcagtgacc cca (SEQ ID NO:385).

OR231

LOCUS AF073967 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR15-71M24 olfactory receptor gene,
partial cds.

ACCESSION AF073967

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
5 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers
source 1..649
10 /organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR15-71M24"
mRNA <1..>649
15 /product="olfactory receptor"
CDS <1..>649
/feature="region between transmembrane domains TM2 and TM7."
/codon_start=2
/feature="olfactory receptor"
20 /translation="LVDICFTTVIVPQMLVNLLTQRKTILFAQCLTQMYFFVAFGITD
SFLLAAMAIDRYVAICNPLHYNTVMSPRRCRLLVASWAVSHLHSLTHTILMGRLSFC
GPNVIHHFFCDVQPLLTLSCSDTSINELLAFTEGSVVIMSPFILLLSLISIFTRTVLR
VPSGEGRYKVFSTCGSHLTVVALFYGTIISVYIRPSSTYSVTKDRVVTVIYTVVTP" (SEQ ID

NO:386).
25 BASE COUNT 134 a 180 c 128 g 207 t
ORIGIN
1 cctggtggac atctgcttta ccactgtcat cgtgccacag atgtagtga acttgctgac
61 acagagaaag acaatcctct ttgccagtg cctcactcaa atgtattct ttgggcttt
121 tggattaca gacagttcc tttggctgc gatggccatt gaccgctatg ttgctattg
30 181 caatcgctt cattacaaca cagtcagtag tcccaggcgc tgcgcttgc tgggtgtggc
241 atcctgggca gtgtcccatc ttaactccct caccacaca attctcatgg gtcgcctctc
301 tttctgtga cccaatgtca ttcactactt cttttgtgat gtccagccac tgctgacact
361 ctctgtctt gacacctcta tcaatgagct ctggccctc acagagggct ctgttgaat
421 catgagccct ttatcttat tgtgtctct tatactata ttactcgga ctgttctgag
35 481 ggcccttca ggggaaggaa ggtacaaagt ttctctacc tgtgggtctc acctcacagt
541 ttagcactg ttctatggaa ccataatc agtgtacatt cggccctcat ccactactc
601 agtgacaaag gaccgagttg tctctgtcat ctatacagta gttaccca (SEQ ID NO:387).

OR232

40 LOCUS AF073968 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR18M olfactory receptor gene,
partial cds.
ACCESSION AF073968
45 KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
50 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are

potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
5 TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
10 source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR18M"
15 mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
20 /product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFIVFYAMFHTLLLARLSFC
KNNVIPHFCDISALLKLACSDVYINELMILILGGFLLVISLLLIIVSYVQIVSSILR
ISSTRAIHKLFSTCGSHLSVVSLFYGTIIGLYLCPSANNSTEKETAMSLMYTVVTP" (SEQ ID
25 NO:388).
BASE COUNT 136 a 155 c 121 g 237 t
ORIGIN
1 cttctctgat cttctgtttt cctctgtcac aatgccaag ttgctgcaga acatgcagat
61 ccaggacaca cccatacct atgtggcttg tctgacacaa atgtacttt tcagtgttt
30 121 tggaagtctg gagatatcc ttctgtagt cctggcctat gaccgctatg tggccatctg
181 ttaccctt caatattcca gcatcatgag cccaatctc tgtgtgtgtg tgggtggtgt
241 ctgctgggta ttattgtgt tttatgcca gtgtcacaca ctactctgg ctagattgtc
301 atttgtaag aacaatgtga tcccacactt ttctgtgac atatctgcc ttctgaagtt
361 ggcatgctct gatgtttata ttaatgaatt aatgatactt atctgggag ggtttcttct
35 421 tgtcatctca ctctactca tcattgtatc ctatgtacaa attgtctect caattttaag
481 gatttcttct actcgggcta tcataagct cttctccacc tgtggtcac acctgtctgt
541 ggtctcactg ttctatggga caattattgg tctgtactta tgtccatcag ctaataact
601 tactgaaaag gagactgcc a tgcctctgat gtacacagtg gtgactccc (SEQ ID NO:389).

OR233

LOCUS AF073969 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone ORIM olfactory receptor gene, partial
cds.
45 ACCESSION AF073969
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
50 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
5 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
10 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
15 /clone="OR1M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/region="region between transmembrane domains TM2 and TM7."
20 /codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLLWMLTTSHAMMHTLLAARLSFC
ENNVILNFFCDLFLVLLKLACSDTYVNELMIFIMSSLLVIPFLIVMSYARIIASILK
25 VPSIQGIYKVFSTCGSHLSVVTLFYGTIIGLYLCPSGNNSTVKGTVMAMMYTVVTP" (SEQ ID
NO:390).
BASE COUNT 142 a 161 c 123 g 223 t
ORIGIN
30 1 ctctctgat ctctgtttt cctctgtcac aatgccaaa ttgctgcaga atatacagag
61 ccaggaccca tccatccct atgcaggctg cctggcaca acatactct ttatggttt
121 tggagatag gagagcttc ttctgtggc catggcctat gaccgctatg tggccatctg
181 ctccctctg cattacacca gcatcatgag tcccaactc tgtggtgtc taatgctgct
241 attgtggatg ctaacaacat cccatgcat gatgcatact ctcttgcag caagattgct
301 ttttgtgag aacaatgtga tctcaattt ttctgtgac ctattgttc tctaaagct
35 361 ggcttgcga gacacttatg ttaatgagt gatgatatt ataagagt cctctctcat
421 tgtattcca ttttctca ttgtcatgic ttatgcaagg atcattgcct ccattctaa
481 ggttccatct attcaaggga tctacaagg ctctccacc tgtggtccc atctgtctgt
541 ggtgacctg tttatggga caattattg tcttactta tgtccatcag gtaataattc
40 601 cacagtaaag gggactgtca tggccatgat gtacacagt gtagctccc (SEQ ID NO:391).

OR234

LOCUS AF073970 649 bp DNA ROD 12-JUL-1999
45 DEFINITION Mus musculus domesticus clone OR21M olfactory receptor gene,
partial cds.
ACCESSION AF073970
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
50 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR21M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADICFTSASIPKMLVNIQTKNKVITYEGCISQVFFILFGVLD
 NFLLAVMAYDRYVAICHPLHYMVIMNRRLCGFLVLGSWVTTALNSLLQSSMALRLSFC
 TDLKIPHFVCELNQLVLLACNDTFPNDMVMYFAAILLGGGPLAGILYSYSKIVSSIRA
 ISSSQGKYKASSTCASHLSVVSFLFYSTLLGAYLSSSFTQNSHSTARASVMYSVVTP" (SEQ ID

NO:392).
 BASE COUNT 150 a 156 c 122 g 221 t
 ORIGIN
 1 ctttcagac atctgcttta cttctgctag catcccaaag atgctagtga atatacagac
 61 aaagaacaag gtgataacct atgaagggtg catttctca gtattctttt tcatactatt
 121 tggagtttta gataacttct ttctagctgt gatggcctat gaccgatatg tggcaatctg
 181 tcacctctg cactatatgg tcatcatgaa ccgccgcctc tgtggatttt tagttttggg
 241 gtcttgggtc acaacagcat tgaattcctt gctgcagagt tcaatggcac tgcggctgtc
 301 cttttgtaca gactgaaaa ttcccactt tgtttgtgag cttaatcaac tgggtactact
 361 tgctgtaat gacaccttct ctaatgacat ggtgatgtac ttgcagcta tactgtctggg
 421 tgggtgtcct ctgctggca tcctttactc ttattctaag atagtttctt ccatacgtgc
 481 aatctcatca tcacagggga agtataaagc atctccacc tgtgcatccc acctctcagt
 541 tgtttcatta ttctattcta cactctggg tgcgtatctt agttcttctt ttacacaaa
 601 ctcacactca actgcacgag catctgttat gtacagtgtg gtcaccccc (SEQ ID NO:393).

OR235

LOCUS AF073971 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR22M olfactory receptor gene,
 partial cds.
 ACCESSION AF073971
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR22M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE

SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTFHAMLHTLLMARLSFC

EDNVIPYFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK

VPSARGIRKAFSTCGSHLSVVSFLFYGTIIIGLYLCPADNSTVKETVMAMMYTVVTP" (SEQ ID

NO:394).

BASE COUNT 121 a 184 c 140 g 204 t

ORIGIN

1 cttctctgat ctctgtcttt cctctgtcac aatgcccaaa ttgctgcaga acatgcagag
61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtacttt tcttgctctt
121 tggagacctt gagagcttcc tccttggtgc catggcctat gaccgctatg tggccatctg
181 ctccccctt cattacatga gcatcatgag cccagcctc tgtgtgagtc tgggtctgct
241 gtctgggtg ctgaccactt tccatgcat gctgcatacc ctgctcatgg ccagattgtc
301 attctgtgag gacaatgtga tcccctactt ttctgtgac atgtctgctc tgctgaagct
361 gtctgtctt gacactcacg ttaatgaatt ggtgatatt gtcacaggag gcctgaccc
421 tgtcatcca ttgtgtctca tccttggtgc ctatgcacga attgtgtcct ccatttcaa
481 ggtcccgctt gctcgaggca tccgtaaagc cttctccacc tgtgggtccc acctgtctgt
541 ggtgtcactg ttctatggga caatcattgg tctgtactta tgtccatcag ctgataactc
601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:395).

OR236

LOCUS AF073972 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR25M olfactory receptor gene, partial cds.

ACCESSION AF073972

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..649

 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR25M"

mRNA <1..>649

 /product="olfactory receptor"

CDS <1..>649

 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
 SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRLSFC
 KNNVIPHFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSILK
 VPSTRGIHKVFSTCGSHLSVVSLFYGSVIVLYLCPSSNNSTVKDTVMSSMYTVVIP" (SEQ ID
 NO:396).

BASE COUNT 136 a 163 c 118 g 232 t

ORIGIN

1 cttcactgac ctctgcttt ctactgtcac aatgcccaat ttctgcгаа acatgcagag
 61 ccaagtatca tcattccct atgcaggctg cctgcacaa atgtacttct tttgtttt
 121 cggatgatgt gagagtttac tcttgttgc catggcctat gaccgttatg tggccatctg
 181 ctccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tggctctgct
 241 gtctcgggca ctgacaacat tgtatgccat gttgcacact ttgctcttaa ctaggttgct
 301 ttctgtaaa aacaatgtga tccccattt ttctgtgac cttctgctc tctgaagct
 361 ggctgctct gatattcaca ttaatgagtt aatgataatg ataattggag cactgttgt
 421 tatactcca ttctactca tcatagtgtc ttatgcgcac attgtctct ccattctcaa
 481 agtccctca actcgaggca tccacaaggt ctctccact tgtgggtctc atctgtctgt
 541 ggtgtcactg ttctatggg catgcattgt tctgtactta tgcctcat ctaataactc
 601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgattccc (SEQ ID NO:397).

OR237

LOCUS AF073973 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR27M olfactory receptor gene,
 partial cds.

ACCESSION AF073973

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR27M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE

SLLLVMAYDRYVAICSPHYTRIMSPNLCVSMVLLSWALTTLTYAMLHTLLTRL SFC

KNNVIPHFFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSTLK

VPSTRGIHKVFSTCGSHLSVVSIFYGSVIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID

NO:398).

BASE COUNT 136 a 165 c 117 g 231 t

ORIGIN

1 cttcactgac ctctgctttt ctactgtcac aatgcccaat ttctgcaaa acatgcagag

61 ccaagtatca tccattccct atgcaggctg ccttgcaaaa atgtacttct tttgtttt

121 tggatgatgt gagagttaac tccttggtgc catggcctat gaccgttatg tggccatctg

181 ctccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tgggtgctgt

241 gtccctgggca ctgacaacat tgtatgcat gttgcacact ttgtcttaa ctagggtgtc

301 ttctgtaaa aacaatgtga tccccattt ttctgtgac cttctgctc tctgaagct

361 ggctgtctct gatattcaca ttaatgagtt aatgataatg ataattggag cactgtgtgt

421 tatactcca ttctactca tcatagtgtc ttatgcgcac attgtctct cactctcaa

481 agtccttca actcgaggca tccacaaggt cttctccact tgggtgtctc atctgtctgt

541 ggtgtcactg ttctatgggt cagtattgt tctgtactta tgtccatcat ctaataactc

601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgactccc (SEQ ID NO:399).

OR238

LOCUS AF073974 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR28M olfactory receptor gene,
partial cds.

ACCESSION AF073974

KEYWORDS .

SOURCE western European house mouse.

[illegible]

5 AUTHORS Giorgi,D.G., Delettire,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

10 **AUTHORS** Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

15	FEATURES	Location/Qualifiers
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source	1..649
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/organism="Mus musculus domesticus"
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/sub species="domesticus"
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/db xref="taxon:10092"
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20 /clone="OR28M"

mRNA <1..>649

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/product="olfactory receptor"
```

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

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25 /codon start=2
```

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/product="olfactory receptor"
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/translation="VVDICYTSSGVPQMLAHFLMEKKTISFALCGTQLFFALTLGGTE

FLLLTAMAYDRYVAVCNPLRYTVVMNPRLCMGLAGVSWFVGVVNSAVETA VTMYLPTC

GHNVLNHVACETLALVRLACVDITLNQVVILASSVVVLMIPCSLVSLSYAHIVAAIMK

IRSTQGRRKAFETCASHLTVVSMYSYGMALFTYLQPASTASAEODKVVVFYALVTP" (SEQ ID

NO:400).

BASE COUNT 119 a 183 c 166 g 181 t

ORIGIN

1 agtgggtggac atctgtaca cctccagtgg ggccccccag atgctggcac acttctcat

61 ggagaaaaag accatctctt ttgccctatg tgggaccag ctctctttg ctctgactct

121 tgggggaact gagttctgt tgetgactgc catggcctat gaccgctatg ttgctgtctg

181 taatccatta cggtagacag tggatgatgaa cccaagggtc tgcattgggtc tagcaggtgt

241 ctcttggttt gtgggtgtag ttaattctgc tgtggagaca gcagtcacca tgtaccttc

301 cacctgtggg cacaatgtac tcaacctgtt ggcctgtgag aactggcac tggtcagact

361 ggctgtgtg gacatcacc tcaaccaagt ggtgatactg gcttctagtg tgggtggtct

421 gatgataccc tgctctctgg tctctctgtc ctatgccac attgtagctg ccatcatgaa

481 gatccgttct acccaggac gccgcaaagc cttgagacc tgtgctccc atctgactgt

541 ggtctccatg tcttatggga tggccctctt cacctacctg cagcctgcct ccacagcctc

601 tgcctgagcag gacaaggtgg tagtgatctt ctatgctttg gtcaccccc (SEQ ID N

5

OR239

LOCUS AF073975 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR29M olfactory receptor gene,
partial cds.

ACCESSION AF073975

KEYWORDS

SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

5 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,

15 France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR29M"

20 mRNA <1..>649
 /product="olfactory receptor"

25 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDLCQSSVIMPKMLEKFVMVKSVISFAECMAQFYLFDFVFAVSE
 CHMLAVMAYDRYVAICNPLLYNVVTMSYKVCSSWMVVGVSGLICATGETVCLLRLLFC
 KADDINHYFCDLLPLLEQSCSNTFINEILGLSFSSFNTPALITLSSYIFIIASILR
 IPSTEGRSKAFSTCSSHILAVAVFFGSLAFMYLQPSSVSSMDQGVSSVFYTIVVP" (SEQ ID

30 NO:402).

BASE COUNT 143 a 159 c 130 g 217 t

ORIGIN

35 1 ttctgtgac ctctgccagt ccagtgtcat catgcccaga atctggaga aattgtcat
 61 ggtgaagagt gtcatttct tgcagaatg catggctcag tttacttat ttgatgttt
 121 tgctgttca gagtgcaca tgctggctgt catggcttat gatcgctatg ttgccatctg
 181 taacccttg ctatataatg ttaccatgtc ttacaaagtg ttttctgga tggtagtggg
 241 ggtgtatagt gtaggcttga ttgtgccac aggggaaaca gtctgcctgc ttagactgct
 40 301 attctgcaa gctgatgaca taaaccacta cttctgtgat ctttaccac tactggaaca
 361 atcctgttc aatacattha tcaatgaaat actaggactg tcttcagtt catttaatac
 421 tactgtcca gctctgacca tctcagttc ctacatctc atcatagcca gcatcctccg
 481 cattccttc actgaaggca ggtccaaagc cttcagcacc tgcagctccc acatcttggc
 541 tgttgcgtc ttcttgggt ctttagcatt catgtacctt cagccatcat cagtcagctc
 45 601 catggaccaa gggaaagtgt cctctgtgtt ttataccatt gttgtgcc (SEQ ID NO:403).

OR240

LOCUS AF073976 649 bp DNA ROD 12-JUL-1999
 50 DEFINITION Mus musculus domesticus clone OR2M olfactory receptor gene, partial
 cds.
 ACCESSION AF073976

KEYWORDS

SOURCE western European house mouse.

ORGANISM *Mus musculus domesticus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; *Mus*.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR2M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSM LHTLLLTRL SFC

ENNVI PHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTVSYARISSILK

VPSTRGIHKVFSTCGSHLSVVSIFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID

NO:404).

BASE COUNT 126 a 177 c 123 g 223 t

ORIGIN

1 cttcactgac ctctgcttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
 61 ccaagtctct tcaatccct atgcaggctg cctgacacaa atgtacttct tttgtttt
 121 tggagatctt gagagcttc tcctgtggc catggcctat gaccgatatg tagccatctg
 181 ctccctctt cattacacca gcattatgag cccaggctc tgtgtgagtc ttgtctgtct
 241 gtctgtgtg ctgacctgt cccattccat gtgcacact ttgtcttaa ctaggttgtc
 301 ttctgtgaa aacaatgtga tccccattt ttctgtgat ctgtctgctc tgcgaagct
 361 ggctgtctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggctgttgt
 421 tatactcca ttctactcg tcacagtgtc ttatgcacgc atcatctct ccaattcaca
 481 ggtccctca actcgaggca tccacaaggt ctctccact tgtgtgtctc acctgtctgt
 541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc
 601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:405).

OR241

LOCUS AF073977 650 bp DNA ROD 12-JUL-1999

DEFINITION *Mus musculus domesticus* clone OR3M olfactory receptor gene, partial cds.

ACCESSION AF073977

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 650)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..650

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR3M"

mRNA <1..>650

/product="olfactory receptor"

CDS <1..>650

/note="region between transmembrane domains TM2 and TM7."

/codon_start=3

/product="olfactory receptor"

/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE

IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVVCVVFCWVFVIFYAMFHTLLARLSFC

KNNVIPHFCDISALLKLACSDVYINELMILILGGFLLVTSLLLIIVSYVQIVSSILR

ISSTRAIHKLFSTCGSHLSVVSIFYGAIIGLYLCPSANNSTKETAMSLMYTVVTP" (SEQ ID

NO:406).

BASE COUNT 135 a 157 c 122 g 236 t

ORIGIN

1 ccttctctga tctctgcttt tctctgtca caatgccaa gttgctgcag aacatgcaga

61 tccaggacac acccatatcc tatgtggctt gtctgacaca aatgtacttt ttcaagtgtt

121 ttggaagtct ggagatattc ctctttag tcttgcccta tgaccgctat gtggccatct

181 gtttaccct tcaatattcc agcatcatga gcccgaatct ctgtgtgtgt gtgggtggtgt

241 tctgctgggt atttattgtg ttttatgcca tgttcacac actactcttg gctagattgt

301 cattttgtaa gaacaatgtg atccacact tttctgtga catatctgcc ctctgaagt

361 tggcatgctc tgatgttat attaagaat taatgatact tatctggga gggtttctc

421 ttgtcacctc actcttactc atcattgtat cctatgtaca aattgtctcc tcaatttaa

481 ggatttctc tactcgggct atccataagc tcttccac ctgtggctca cacctgtctg

541 tggctcact gttctatggg gcaattattg gtctgtactt atgtccatca gctaataact

601 ctactgaaaa ggagactgcc atgtccctga tgacacagt ggtgactccc (SEQ ID NO:407).

OR242

LOCUS AF073978 648 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR4M olfactory receptor gene, partial

cds.

ACCESSION AF073978

KEYWORDS .

SOURCE western European house mouse.

ORGANISM *Mus musculus domesticus*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; *Mus*.

REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source	1..648
	/organism="Mus musculus domesticus"
	/sub_species="domesticus"
	/db_xref="taxon:10092"
	/clone="OR4M"
mRNA	<1..>648
	/product="olfactory receptor"
CDS	<1..>648
	/note="region between transmembrane domains TM2 and TM7."
	/codon_start=2
	/product="olfactory receptor"
	/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLQMQYFFSVFGSLE IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFVIFYAMFHTLLLARLSFC KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLLVISLLLIIVSYVQIVSSILR ISSTRAIHKLFSTCGSHLSVSVSLFYGTIIGLYLCPSANNSTEKETAMSLMYTVVTP" (SEQ ID

NO:408).

BASE COUNT 135 a 154 c 122 g 237 t

ORIGIN

1 ctctctgat ctctgcttt cctctgtcac aatgcccaag ttgctgcaga acatgcagat
61 ccaggacaca cccatatcct atgtggcttg tctgacacaa atgtacttt tcagtgttt
121 tgggagctcg gagatatcc ttctttagt cctggcctat gaccgctatg tggccatcg
181 ttacccect caatattcca gcatcatgag cccaatctc tgtgtgtgtg tgggtgtgt
241 ctgtcgggta ttattgtgt ttatgccat gttcacaca ctactctgg ctagattgtc
301 atttgtgaag aacaatgtga tccacacct ttctgtgac atatctgccc ttctgaagt
361 ggcgatctct gatgttata ttaatgaatt aatgatact atctgggag ggtttctct
421 tgtcatctca ctcttactca tcattgtatc ctatgtacaa atgtctcct caattttaag
481 gatttctct actcgggcta tcataagct cttctccacc tgtggctcac acctgtctgt
541 ggtctcactg ttctatggga caattattgg tctgtactta tgtccatcag ctaataactc
601 tactgaaaag gagactgcca tctccctgat gtacacagtg gtgactcc (SEQ ID NO:409).

OR243

LOCUS AF073979 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR5M olfactory receptor gene, partial
5 cds.

ACCESSION AF073979

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

15 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

20 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..649

25 /organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR5M"

mRNA <1..>649

30 /product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

35 /translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYASCLTQMYFFMAFGNME

IYLLVVMAYDRYVAICFPLHYTSIMSPKLCVSLVVLVSWVFTILYSMLHTLLARLSFC

EDNVIPHFFCDISALLKLACSDISINELMIFIVGGLDTVIPFLIVVSYVQIVCSILK

FSSTRGIHKVFSTCGSHLSVSVSLFYGTIIGVYICPSANNSTVKETVMSLMYTVVTP" (SEQ ID

NO:410).

40 BASE COUNT 135 a 171 c 124 g 219 t

ORIGIN

1 ctctctgat ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag

61 ccaggaccaca tccatccct atgccagctg tctgacacaa atgtactttt tcatggcttt

121 tgggaacatg gaaatttacc ttcttggtgt catggcctat gaccgctatg tggccatctg

45 181 ctccctctt cattacacca gcatcatgag ccctaagctc tgtgtgtctc tgggtgttct

241 ctctgggta ttaccattc tgtattccat gtacacacc ctactctgg caagattgtc

301 attctgtgag gacaatgtga tcccccaatt ttctgtgac atatctgccc tgcacagtt

361 ggctgtctc gacatttcta ttaatgaact aatgatatt atcgtgggag ggcttgatac

421 tgtaatccca tttttactca ttgtgttc ctatgtacaa attgtctgct ccattctaaa

50 481 gttctcatc acacggggca tacacaaggc cttctccacc tgttgctccc acctgtctgt

541 ggtctcactg ttctatggga caattattgg tgtctacata tgcccatcag ctaataactc

601 tactgtgaag gagactgtca tgcctctgat gtacacagtg gtgacgccc (SEQ ID NO:411).

OR244

LOCUS AF073980 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR6M olfactory receptor gene, partial cds.

ACCESSION AF073980

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR6M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMHLTLLTRLSFC

ENNVIPHFCDLSALLKLACSDIHINELVILIIGGLVVILPFLVTPYARISSILK

VPSTRGIHKVFSTCGSHLSVVSFLFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID

NO:412).

BASE COUNT 126 a 178 c 123 g 222 t

ORIGIN

1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag

61 ccaagtctct tcaatcccct atgcaggctg cctgacacaa atgtacttct tttgtttt

121 tggagatctt gagagcttcc tcctgtggc catggcctat gaccgatatg tagccatctg

181 ctccctctt cattacacca gcattatgag cccaggctc tgtgtgagtc ttgtctgct

241 gtcttggtg ctgacctgt cccattccat gctgcacact ttgctcttaa ctagggtgtc

301 ttctgtgaa aacaatgga tccccattt ttctgtgat ctgtctgctc tgcgaagct

361 ggctgtctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggctgtgtgt

421 tatacttcca ttctactcg tcacagtgcc ttatgcacgc atcatctct cattctcaa

481 ggteccctca actcgaggga tccacaaggt ctctccact tgtggttctc acctgtctgt

541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc

601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:413).

OR245

5 LOCUS AF073981 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR7M olfactory receptor gene, partial
cds.
ACCESSION AF073981
KEYWORDS .
10 SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
25 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
30 /clone="OR7M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
35 /codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRL SFC
KNNVIPHFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSILK
40 VPSTRGIHKVFSTCGSHLSAVSLFYGSVIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID
NO:414).
BASE COUNT 136 a 165 c 117 g 231 t
ORIGIN
1 ctctactgac ctctgctttt ctactgtcac aatgcccaat ttctgcaaa acatgcagag
45 61 ccaagatca tcattccct atgcaggctg ccttgcaaaa atgtacttct tttgtttt
121 tggatgatgt gagagcttac tcttgtgtgc catggcctat gaccgttatg tggcatctg
181 ctccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tgggtctgct
241 gtctctgggca ctgacaacat tgtatgcat gttgcacact ttgctcttaa ctagggtgtc
301 ttctgtaaa aacaatgtga tccccattt ttctgtgac cttctgctc tctgaagct
50 361 ggcctgctct gatattcaca ttaatgagtt aatgataatg ataattggag cactgtgtgt
421 tatacttca ttctactca tcatagtgtc ttatgcgcac attgtctcct ccattctcaa
481 agtcccttca actcgaggca tccacaaggt ctctccact tgtggttctc atctgtctgc

541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc
 601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgactccc (SEQ ID NO:415).

OR246

LOCUS AF073982 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR8M olfactory receptor gene, partial
 cds.
 ACCESSION AF073982
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR8M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
 SFLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLLWMLTTSHAMMHTLLAARLSFC
 ENNVILNFFCDLFLVLLKLACSDTYVNELMIFIMSSLLIVIPFFLIVMSYARIIASILK
 VPSIQGIYKVFSTCGSHLSVVTLYFYGTIIGLYLCPSGNNSVTKGTVMMAMMYTAVTP" (SEQ ID
 NO:416).
 BASE COUNT 143 a 162 c 123 g 221 t
 ORIGIN
 1 ctctctgat ctctgctttt cctctgtcac aatgccccaa ttgctgcaga atatacagag
 61 ccaggaccca tccatccctc atgcaggctg cctggcacia acatacttct ttatggtttt
 121 tggagatag gagagcttcc ttctgtggtc catggcctat gaccgctatg tggccatctg
 181 ctccctctg cattacacca gcatcatgag tcccaaactc tgggtgtgc taatgctgct
 241 attgtgatg ctaacaacat cccatgcat gatgcatact ctcttgcag caagattgtc
 301 ttttgtgag aacaatgtga tctcaattt tttctgtgac ctattgtac tctaaagct
 361 ggcttgctca gacacttatg ttaatgagtt gatgatatt ataagagtt cctctctcat
 421 tgttattcca ttttctca ttgcatgctc ttatgcaagg atcattgcct ccattcttaa

481 ggttccatct attcaaggga tctacaaggt cttctccacc tgtggtccc atctgtctgt
 541 ggtgaccttg ttttatggga caattattgg tctctactta tgtccatcag gtaataattc
 601 cacagtaaag gggactgtca tggccatgat gtacacagcg gtgactccc (SEQ ID NO:417).

5 OR247

LOCUS AF073983 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M4 olfactory receptor gene,
 partial cds.

10 ACCESSION AF073983

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

15 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

20 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

25 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

30 /sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR912-47M4"

mRNA <1..>649

/product="olfactory receptor"

35 CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFAELD

40 NFLLA VMAYDRYVAICHPLYYTIVNQHLCLMVLLSWVVSILHAFLQSSIVLQLTFC

GDVKIPHFFCELNQLSQLTCSDFSSQLIMNLVPVLLAVISFSSILYSYFKIVSSICS

ISSVQGKYKAFSTCVSHLSIVSLFYSTGLGVYVSSVVIQSSHSAARASVMYTVVTP" (SEQ ID

NO:418).

BASE COUNT 148 a 157 c 118 g 226 t

45 ORIGIN

1 ctttgggac atctgttta cctccaccac tgtcccaaag atgctggtaa atatacagac

61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggttt

121 tgcagaattg gacaacttc tcttggtgt gatggcctat gaccgatatg tggctatctg

181 tcaccatta tattacacag tcattgttaa ccaacatctc tgtatactga tggttctgct

50 241 gtctggggt gtagcatcc tacatgcctt cttacagagc tcaattgtgc tacagttgac

301 ctttttgga gatgtaaaaa ttcccactt cttctgtgag ctttaaccage tgtctcaact

361 cacatgtca gagagctttt caagccaact cataatgaat cttgtacctg ttctattggc

421 agtcatttcc ttacagtagta tcctttactc ttatttcaag atagtgtcct ccatatgttc
 481 tatctcctca gtccaaggga agtacaaggc attttctaca tgtgtctctc accttccat
 541 tgtctcctta tttatagta caggccttgg agtgtatgtc agttctgttg tgatccaaag
 601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcaccccg (SEQ ID NO:419).

5

OR248

LOCUS AF073984 646 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR912-47M6 olfactory receptor gene,
 partial cds.

ACCESSION AF073984

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 646)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 646)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..646

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR912-47M6"

mRNA <1..>646

/product="olfactory receptor"

CDS <1..>646

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="SVDVCFSSSTTVPKVLAIHILRNQAISFSGCLTQLYFLCVFADMD

NFLAVMAYDRFVAICHPLHYTTKMTHQLCAFLVVGSWMVASLNALLHTLLVAQLYFC

GDNVIPHFFCEVTPLKLSKSDTHLNEMLAVAGLIMLAPFVCILLSYILIACAILK

ISSTGRWKAFSTCGSHLAVVCLFYGTIISLYFNPSSSHSAGRDMAAAMMYTVVTP" (SEQ ID

NO:420).

BASE COUNT 128 a 178 c 133 g 207 t

ORIGIN

1 ctctgtggat gtagcttct cctccaccac tgtccctaag gtactggcca ttacatact

61 aagaaatcaa gccatttctg tctctgggtg cctcacacag ctgtatttc tctgtgtgt

121 tgctgacatg gacaatttcc tgctggctgt gatggcctat gaccgatttg tggccatatg

181 ccacccttta cactacacaa caaagatgac ccatcagctt tgtgccttc ttgttgttgg

241 gtctggatg gtagccagtc tgaatgctct gttgcacaca ctgctcgtgg ctcaactcta

301 cttctgtggg gacaatgtga tccccactt cttctgtgaa gtgactcccc tgctgaaact

361 ctcttgetca gacacacatc tcaatgagtt gatgattctt gctgttgag ggctgataat
 421 gttagctcca ttgtttgca tcctctgtc ttatatacctt attgcttggt ccatcctgaa
 481 aatctcatcc acaggaagat ggaaagcctt ctctacctgt ggctcacact tggctgttgt
 541 gtgcctcttc tatggcacta tcatatccct gtatttcaac ccctcatctt ctactcagc
 5 601 tgggaggagac atggcagctg ccatgatgta cacagtgggtg accccc (SEQ ID NO:421).

OR249

LOCUS AF073985 650 bp DNA ROD 12-JUL-1999
 10 DEFINITION Mus musculus domesticus clone OR912-47M7 olfactory receptor gene,
 partial cds.
 ACCESSION AF073985
 KEYWORDS .
 SOURCE western European house mouse.
 15 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 650)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 20 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 650)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 30 source 1..650
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR912-47M7"
 35 mRNA <1..>650
 /product="olfactory receptor"
 CDS <1..>650
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 40 /product="olfactory receptor"
 /translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFGELD
 NFLAVMAYDRYVAICHPLYTYFIVNQHLCLMVLLSWVVSILHAFQLQSSIVLQLTFC
 GDVRIPHFFCELNQLSQLTCSDSLSSHLIMHLVPVLLGAISFSSILYSYFKIVSSICS
 ISSVQKGKYKAFSTCVSHLSIVSLFYSTGLGVYVSSAVVQSSHSAARASVMYTVVTH" (SEQ ID
 45 NO:422).
 BASE COUNT 148 a 159 c 121 g 222 t
 ORIGIN
 1 ctttgtggac atctgtttca cctccaccac tgtcccaaag atgctggtaa atatacagac
 61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
 50 121 tggagaactg gacaacttct tcctggctgt gatggcctat gaccgatatg tggctatctg
 181 tcaccattg tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgct
 241 gtctctgggt gttagcatcc tacatgcctt cttacagagc tcaattgtac tacagtgac

301 ctttggga gatgaagaa ttcccactt cttctgtgag ctaaccagc tgttcaact
 361 cacatgttca gacagcttat caagccacct cataatgcat cttgtacctg ttctattggg
 421 agccatttcc ttcagtagta tctttactc ttatttcaag atagtgtcct ccatatgttc
 481 tatctcctca gttcaaggga agtacaaggc atttctaca tgtgtctctc acctttccat
 5 541 tgtatcctta tttatagta caggccttgg agtgtatgtc agttctgtcg tgggtccaaag
 601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcacacacg (SEQ ID NO:423).

OR250

10 LOCUS AF073986 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M8 olfactory receptor gene,
 partial cds.
 ACCESSION AF073986
 KEYWORDS .
 15 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 20 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 25 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 30 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 35 /clone="OR912-47M8"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 40 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFTSTTVPKVLVNIQTQSKAITYADCISQMSVFLVFAELD
 NFLAVMAYDRYVAICHPLYTYFIVNQHLCLMVLLSWVVSILHAFLQSSIVLQLTFC
 GDVKIPHFCELNQLSQLTCLDSFSSHLIMNLVPVLLAVISFSSILYSYFKIVSSICS
 45 ISSVQGKYKAFSTCVSHLSIVFLFYSTGLGVYVSSAVVQSSHAARASVMYTVVTP" (SEQ ID
 NO:424).
 BASE COUNT 144 a 159 c 120 g 226 t
 ORIGIN
 1 ctttgggac atctgtttca cctccaccac tgtcccaaag gtgctggtaa atatacagac
 50 61 tcaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
 121 tgcagaattg gacaacttc tcttggtgt gatggcctat gaccgatatg tggctatctg
 181 tcaccattg tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgct

241 gtctgggtt gttagcatcc tacatgcctt cttacagagc tcaattgtgc tacagttgac
 301 cttttgtgga gatgtaaaaa ttcccactt cttctgcgag cttaccagc tgtctcaact
 361 cacatgttta gacagctttt caagccacct cataatgaat cttgtacctg ttctattggc
 421 agtcatttcc ttacagtaga tcctttactc ttatttcaag atagtgtcct ccatatgttc
 481 tatctctca gttcaaggga agtacaaggc atttctaca tegtctctc accttccat
 541 tgtctctta tttatagta caggccttgg agtgtatgtc agttctgctg tggccaag
 601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcaccccg (SEQ ID NO:425).

OR251

LOCUS AF073987 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M9 olfactory receptor gene,
 partial cds.
 ACCESSION AF073987
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR912-47M9"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADLCFSTTTVPQVLVHFLVKRKTISFAGCSTQIVVLLLVGCTE
 CALLAVMSYDRYVAVCKPLHYSTIMTHWLCVQLAAGSWASGALVSLVDTTFTLRPLPYR
 GNNVINHFFCEPPALLKLASADTYSTEMAIFAMGVVILLAPVSLILTSYWNIISTVIQ
 MQSGEGRCLKVFSTCGSHLIVVVLFGSAIFAYMRPNSKIMNEKDKMISVFYSAVTP" (SEQ ID
 NO:426).
 BASE COUNT 141 a 175 c 146 g 187 t
 ORIGIN
 1 ctttcagat ctctgcttt ctactaccac agtgccccag gtgctgtgcc acttctcgtt
 61 gaagaggaag accatttctt ttgctggatg ttctacacag atagtgggtg tgcttctggt
 121 cggatgcaca gagtgtgcac tgctggcagt gatgtcctat gaccgatatg tggctgtctg

181 caaacctctg cactactcca ccatcatgac aactggcta tgtgttcagc tggctgcagg
 241 gtctgggcc agtgggtcac ttgttcctt ggtggatacc acattcacat tacgtcttcc
 301 ttatcgagga aacaatgtca ttaaccactt ttctgtgaa cctcctgccc tctgaagct
 361 ggcacggcca gatacatca gcacagagat ggcgatctt gcaatgggtg tggtaatcct
 421 cctagcacct gtctccctca tctcacctc ctactggaac atcatctcca ctgtaatcca
 481 gatgcagtct ggggaaggaa ggctcaaggt ctctccacc tgtggctccc acctcattgt
 541 tgtgttctc ttctacggt cagcaatatt tgcctacatg aggcccaact ctaagataat
 601 gaatgaaaag gataaatga ttctggtgtt ctattcagca gtgaccccg (SEQ ID NO:427).

OR252

LOCUS AF073988 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR9M olfactory receptor gene, partial
 cds.

ACCESSION AF073988

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,

France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR9M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMMLHTLLLTRL SFC

ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVILPFLLVTVSYARISSILK

VPSTRGIHKVFSTCGSHLSVVSFLFYGTIIIGLYLCP SANNSTLKDTVM SLMYTVVTP" (SEQ ID

NO:428).

BASE COUNT 126 a 177 c 123 g 223 t

ORIGIN

1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag

61 ccaagtctct tcaatcccct atgcaggctg cctgacacaa atgtacttct tttgtttt

09747155.122100

121 tggagatctt gagagcttcc tccttggtggc catggcctat gaccgatatg tagccatctg
181 cttccctctt cattacacca gcattatgag ccccaggctc tgtgtgagtc ttgtgctgct
241 gtctctggtg ctgacctgt cccattccat gctgcacact ttgctcttaa ctagggtgtc
301 ttctgtgaa aacaatgtga tccccattt ttctgtgat ctgtctgctc tgctgaagct
361 ggctgctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttgtgtg
421 tatactcca ttctactcg tcacagtgc ttatgcacgc atcatctct ccattctcaa
481 ggtcccttca actcgaggca tccacaaggt cttctccact tgtggtctc acctgtctgt
541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc
601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:429).

OR253

LOCUS AF073989 1865 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus clone OR1-72M13 olfactory receptor gene, complete cds.
ACCESSION AF073989
KEYWORDS .

SOURCE house mouse.

ORGANISM Mus musculus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 1865)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 1865)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..1865

/organism="Mus musculus"

/db_xref="taxon:10090"

/clone="OR1-72M13"

/cell_line="NIH3T3"

mRNA 547..1482

/product="olfactory receptor"

CDS 547..1482

/note="orthologous to human gene OR1-72"

/codon_start=1

/product="olfactory receptor"

/translation="MKPENQTKYFRIFASGVFQYPEHQPMLFGLFLLMFVVAVLGNLL

IILAVSIDSHLHTPMYFFLSNLSFSDIGFISTTVPKMLVNIQTQSKSISYAECITQIY

FFMLFGGMDTLLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLVSWFISFSYSLIQS

LLMLRLSFCTNQIKHFYCEYAKALTIACSDTLINHILLYIVIWVLGFIPFSGILYSY

YKIFSSILRIPSTDGKYKAFSTCGSHLSVVSFLFYGTGLSVYLSSDATSSSGKGVVASV

MYTVVTPMLNPFYSLRNKDIKKALKTLGRILLK" (SEQ ID NO:430).

BASE COUNT 568 a 355 c 321 g 621 t

ORIGIN

1 ctgcagagtg agttctagga cagccaggac tacacagaga aacctgaat caaaataaaa

121 taaaataaaaa tacaatagaa taaaataaaa taaacaaaaa agaaaaaa agaaaaaga agataaagat
 181 cagagacctt tctgaatgat cagaacttag tgtaaccact gaaaaatgtt gagaagtga
 241 gttggaatc agagttgatc catcataaag gattacagca ctttagaaa ctgactgct
 301 tgatctaaca ctccagagg ttatctggtc ttcatgtgtt taaaatttg tagagttagc
 361 agttctaagt agagataagg tagagaaact aataatgatg agaaaatgca ggattcctaa
 421 tttttattg aataaaagct ttatgtacag ttattccaac acataaaagg acagagacct
 481 tagagactgt agtgtatgtt cctcaatctt tctctccagt aggtgtctag cttattgtc
 541 aacaacatga aaccagaaaa ccaacaaaaa ttttagaa ttttgcctc tggggtttc
 601 caatatccag agcatcaacc catgctattt ggactgttgc tgctcatgtt tgtggctgct
 661 gtgctggga atcttctcat catctggcc gtcagcattg actctacct gcatactcc
 721 atgtacttct ttcatctaa cctgtcctt tctgacattg gtttcatctc tacaactgct
 781 cctaagatgt tgggtaatat ccaaacacag agcaagtcca tctctatgc agaatgcac
 841 acccagattt atttttcat gctctttgga ggcattggaca cacttctct caccgtgatg
 901 gcctatgacc gatttgggc catctgtcac ccacttact attcagtcac tatgaatcct
 961 caactaagtg gtttgctagt tctgtatca tggtttata gctttcata ttctctgata
 1021 cagagctcat tgatgctgcg gttgtcctc tgtacaaac agataattaa acactttac
 1081 tgtgaatatg ccaaagccct cactatagcc tgctcagata cactaatcaa tcatacctt
 1141 ctttatattg tgatatgggt cttggcttc atcccttct cagggatcct ttaticatac
 1201 tataaaattt ttcttcaat ttgagaatt ccatcaacag atggaaaata taaagcattt
 1261 tctacctgtg ggtctcatct atcgggtggt tctttatct atgggacagg ccttagtgtg
 1321 taccttagtt ctgatgtcac ttctctctc gggaagggcg tgggtgcctc agtaattgat
 1381 acagtggta ccccatgct gaacccttc atctacagct tgaggaaaca agacataaag
 1441 aaggccttaa aaacacttgg gagaatact ctttaaagt gataattca ctggttttag
 1501 acactgtaac tgatgagaat aaaaattgta actaaagaa tctgtacta taatcatgta
 1561 gaattttt ccagtttgtt ggtctatctt tgataaaat taaactgtga atatttcat
 1621 ctgaaatttc tatgatgcct cctttttat tcgaagtctt ttgtctctc cctgtttta
 1681 tacgacatat ttcttactt cagtacaaa tctacatttc agcatgcca tataaccatt
 1741 caaataccaa ttcatgaatt gtttagtaaa agttatgcaa tggctcattt acagaaagtc
 1801 catgtatata tatataacac ttgttgggtt tggccgact ctgtattctg atattaattc
 1861 tgcag (SEQ ID NO:431).

As used herein, the terms “ORX nucleic acid sequence” and/or “ORX nucleic acid molecule” specifically refer to the sequences of GenBank Accession Nos. AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

Likewise, the term “ORX polypeptide” specifically refers to the polypeptide sequences of GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-

179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989.

To sample the ORX genes in primate species, ORX genes were randomly sequenced from anthropoids and prosimians (*See* FIG. 1). As outlined in Examples 1-3, *infra*, ORX genes were obtained by PCR on genomic DNA from the different species using consensus ORX primer pairs OR5B-OR3B and OR3.1-OR7.1 chosen respectively in the transmembrane domains TM2 and TM7, and TM3 and TM7. Except for humans, eighteen to thirty-five individual ORX clones were sequenced per taxon. A total of 221 ORX sequences, representing ten species, was analyzed. These sequences are distributed in different groups whose percentage of nucleotide sequence identity (NSI) ranges from ~35 to >99%. The corresponding amino acid sequences were compared to a variety of ORX sequences from the public databases and previous studies. *See* Rouquier et al., (1998) *Nature Genet.* 18, 243-50.

All sequences have the characteristic features of olfactory receptors, with a heptahelical structure and conserved motifs as previously defined. *See* Buck et al., (1991) *Cell* 65, 175-187; Rouquier et al., (1998) *Nature Genet.* 18, 243-50; and Rouquier et al., (1998) *Hum. Mol. Genet.* 7, 1337-45. The use of two pairs of consensus primers made the sampling representative of the ORX gene repertoire. Primate sequences are distributed in seven families (sequences that share >40% amino-acid identity (ASI) define a family), and 56 subfamilies (sequences that share >60% ASI define a subfamily). Group 1-II of family 1 represents the zone of overlap of sequences derived from using the two primer pairs (*See* FIG. 2).

Non-human primate ORX genes are represented in 6 families and about 45 subfamilies. Numerous sequences are grouped in family 1 (~66%) comprising subfamily 1A, the largest subfamily (57/221, 26%). Subfamily 1B is almost devoid of coding human ORX sequences (FIG. 2). Subfamily 1A contains only human pseudogenes originating from chromosomes 14 and 19 whereas subfamily 1B contains human pseudogenes lying on various chromosomes. As has been previously found for human, the amino-acid sequences deduced from the non-human primate sequences revealed many pseudogenes (FIG. 2 and Table 1).

Table 1 provides information about the evolution of the pseudogene fraction along with the evolution of primates. Hominoids present the highest fraction of pseudogenes (39 to >70%, average ~50%). Old world monkeys (macaque and baboon) have a lower pseudogene fraction

(20 to 35%, average 27%), while even fewer pseudogenes were found among the sequences derived from new world monkeys. Only one pseudogene (SBO64) was identified among the 49 sequences obtained from marmoset and two species of squirrel-monkey. In contrast, 37% of the prosimian lemur ORX sequences were pseudogenes.

09747155 433400
0072237 55724260

TABLE 1

Species						
	Common name		Number of sequences analyzed	% ORF	% pseudogenes	Average % pseudogenes
Hominoids	Human	Homo sapiens (HSA)	99	30	70	50 %
	Chimpanzee	Pan troglodytes (PTR)	21	52	48	
	Gorilla	Gorilla gorilla (GGO)	18	50	50	
	Orangutan	Pongo pygmaeus (PPY)	23	61	39	
	Gibbon	Hylobates lar (HLA)	22	59	41	
Old world monkeys	Macaque	Macaca sylvanus (MSY)	20	65	35	27 %
	Baboon	Papio papio (PPA)	21	81	19	
New world monkeys	Marmoset	Callithrix jacchus (CJA)	19	100	0	2 %
	Squirrel-monkey	Saimiri sciurus (SSC)	15	100	0	
		Saimiri bolivensis (SBO)	15	93	7	

Prosimians	Lemur	Eulemur fulvus (EFU)	19	58	42	37 %
		Eulemur rubriventer (ERU)	16	69	31	
Rodents	Mouse	Mus musculus (MMU)	33	100	0	0 %
Fish	Zebrafish	Danio rerio (DRE)	3	100	0	0 %

Diverse reasons have been suggested that could account for the differences in olfactory ability among mammals, *i.e.*, the size of the anatomical structures devoted to olfaction (olfactory epithelium, olfactory bulb, cortical structures), or the number of ORX families/subfamilies, and the total number and diversity of expressed ORX genes. The olfactory epithelial surface of macrosmatic animals, such as dogs, is larger than in microsmatic humans. On the other hand, using unique dog sequence probes that represent specific ORX subfamilies and which will not cross-hybridize with other subfamilies, comparative analyses have been performed by Southern blot analysis among a panel of mammals including dog and human. The number of ORX sequences per subfamily is similar in microsmatic and macrosmatic animals. A high fraction (>70%) of the human ORX genes have been mutated during evolution into pseudogenes. Chromosomes 7, 16 or 17 contained a high fraction of potentially coding ORX sequences, whereas other chromosomes such as chromosome 3 or 11 contained primarily pseudogenes. Other studies on chromosome 17 and on chromosome 11 in which 75% of the ORX sequences identified were pseudogenes, support these observations.

All ORX sequences derived from mouse are potentially coding. No pseudogenes were detected either by sequencing randomly selected ORX sequences or by deliberately screening with human ORX pseudogene probes. This indicates that the ORX pseudogene content is either zero or restricted to rare examples in mouse.

Thus, the reduction of the sense of smell could correlate with the fraction of functional ORX genes in the genome.

It is difficult to measure and compare the olfactory efficiency of different animal species. Various parameters such as the threshold of detection of odorants (sensitivity), the range of odors detectable and the discriminatory power (acuity) are key parts of the olfactory ability. Thus it is uncertain to determine precisely which of these parameters are taken in account when comparing two species, and therefore the origin of the olfactory deficiency of primates remains a controversial and difficult point to address.

The chromosomal distribution of the ORX gene repertoire arose through multiple duplication rounds giving rise to paralogous regions. Even though the number of duplication events may be different among the mammals, overall it appears that the number of ORX genes was established before the divergence of mammals. See Ben-Arie et al., (1994) *Hum. Mol.*

Genet. 3, 229-35. This explains why, by Southern analysis, there is no striking difference in the number of ORX genes of four different subfamilies between the sea lion, which has an underdeveloped olfactory apparatus, and other mammals. *See id.* On the other hand, the Southern blot approach does not reveal the functionality of the ORX sequences, and we predict that a large fraction of the sea lion ORX genes could be pseudogenes as has been described for the dolphin. *See Sharon et al., (1999) Genomics, 61, 24-36.* Similarly striking differences have been observed in the olfactory ability of different breeds of dogs. *See Issel-Tarver et al., (1996) Proc. Natl. Acad. Sci. USA 93, 10897-902.* Despite the variations in the size of the olfactory epithelium of the different breeds, it would be interesting to know what the biological basis is for the differences in performances observed between sight and scent hounds. One obvious possibility is loss of functional ORX genes, but, given the recent origin of all modern dogs this explanation seems unlikely. Other explanations could be changes in behavior, or in expression brought about by the modification of a key master transcription factor or in the unusual mechanism that allows only one ORX gene allele or the other to be expressed exclusively in any one epithelium cell.

ORX Nucleic Acids

The nucleic acids of the invention include those that encode an ORX polypeptide or protein. As used herein, the terms polypeptide and protein are interchangeable.

In some embodiments, an ORX nucleic acid encodes a mature ORX polypeptide. As used herein, a "mature" form of a polypeptide or protein described herein relates to the product of a naturally occurring polypeptide or precursor form or proprotein. The naturally occurring polypeptide, precursor or proprotein includes, by way of nonlimiting example, the full-length gene product, encoded by the corresponding gene. Alternatively, it may be defined as the polypeptide, precursor or proprotein encoded by an open reading frame described herein. The product "mature" form arises, again by way of nonlimiting example, as a result of one or more naturally occurring processing steps that may take place within the cell in which the gene product arises. Examples of such processing steps leading to a "mature" form of a polypeptide or protein include the cleavage of the N-terminal methionine residue encoded by the initiation codon of an open reading frame, or the proteolytic cleavage of a signal peptide or leader sequence. Thus a

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5 mature form arising from a precursor polypeptide or protein that has residues 1 to N, where residue 1 is the N-terminal methionine, would have residues 2 through N remaining after removal of the N-terminal methionine. Alternatively, a mature form arising from a precursor polypeptide or protein having residues 1 to N, in which an N-terminal signal sequence from residue 1 to residue M is cleaved, would have the residues from residue M+1 to residue N remaining. Further as used herein, a “mature” form of a polypeptide or protein may arise from a step of post-translational modification other than a proteolytic cleavage event. Such additional processes include, by way of non-limiting example, glycosylation, myristoylation or phosphorylation. In general, a mature polypeptide or protein may result from the operation of only one of these processes, or a combination of any of them.

10 Among the ORX nucleic acids is the nucleic acid whose sequence is provided by GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof. Additionally, the invention includes mutant or variant nucleic acids of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof, any of whose bases may be changed from the corresponding bases shown in the ORX nucleic acids, while still encoding a protein that maintains at least one of its ORX-like activities and physiological functions (*i.e.*, modulating angiogenesis, neuronal development). The invention further includes the complement of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, including fragments, derivatives, analogs and homologs thereof. The invention additionally includes nucleic acids or nucleic acid fragments, or complements thereto, whose structures include chemical modifications.

20 One aspect of the invention pertains to isolated nucleic acid molecules that encode ORX proteins or biologically active portions thereof. Also included are nucleic acid fragments sufficient for use as hybridization probes to identify ORX-encoding nucleic acids (*e.g.*, ORX mRNA) and fragments for use as polymerase chain reaction (PCR) primers for the amplification or mutation of ORX nucleic acid molecules. As used herein, the term “nucleic acid molecule” is intended to include DNA molecules (*e.g.*, cDNA or genomic DNA), RNA molecules (*e.g.*, mRNA), analogs of the DNA or RNA generated using nucleotide analogs, and derivatives,

fragments and homologs thereof. The nucleic acid molecule can be single-stranded or double-stranded, but preferably is double-stranded DNA.

"Probes" refer to nucleic acid sequences of variable length, preferably between at least about 10 nucleotides (nt), 100 nt, or as many as about, *e.g.*, 6,000 nt, depending on use. Probes are used in the detection of identical, similar, or complementary nucleic acid sequences. Longer length probes are usually obtained from a natural or recombinant source, are highly specific and much slower to hybridize than oligomers. Probes may be single- or double-stranded and designed to have specificity in PCR, membrane-based hybridization technologies, or ELISA-like technologies.

An "isolated" nucleic acid molecule is one that is separated from other nucleic acid molecules that are present in the natural source of the nucleic acid. Examples of isolated nucleic acid molecules include, but are not limited to, recombinant DNA molecules contained in a vector, recombinant DNA molecules maintained in a heterologous host cell, partially or substantially purified nucleic acid molecules, and synthetic DNA or RNA molecules. Preferably, an "isolated" nucleic acid is free of sequences which naturally flank the nucleic acid (*i.e.*, sequences located at the 5' and 3' ends of the nucleic acid) in the genomic DNA of the organism from which the nucleic acid is derived. For example, in various embodiments, the isolated ORX nucleic acid molecule can contain less than about 50 kb, 25 kb, 5 kb, 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of nucleotide sequences which naturally flank the nucleic acid molecule in genomic DNA of the cell from which the nucleic acid is derived. Moreover, an "isolated" nucleic acid molecule, such as a cDNA molecule, can be substantially free of other cellular material or culture medium when produced by recombinant techniques, or of chemical precursors or other chemicals when chemically synthesized.

A nucleic acid molecule of the present invention, *e.g.*, a nucleic acid molecule having the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a complement of any of these nucleotide sequences, can be isolated using standard molecular biology techniques and the sequence information provided herein. Using all or a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, as a hybridization probe, ORX nucleic acid sequences can be isolated using standard

hybridization and cloning techniques (*e.g.*, as described in Sambrook *et al.*, eds., MOLECULAR CLONING: A LABORATORY MANUAL 2nd Ed., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989; and Ausubel, *et al.*, eds., CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993.)

5 A nucleic acid of the invention can be amplified using cDNA, mRNA or alternatively, genomic DNA, as a template and appropriate oligonucleotide primers according to standard PCR amplification techniques. The nucleic acid so amplified can be cloned into an appropriate vector and characterized by DNA sequence analysis. Furthermore, oligonucleotides corresponding to ORX nucleotide sequences can be prepared by standard synthetic techniques, *e.g.*, using an
10 automated DNA synthesizer.

As used herein, the term "oligonucleotide" refers to a series of linked nucleotide residues, which oligonucleotide has a sufficient number of nucleotide bases to be used in a PCR reaction. A short oligonucleotide sequence may be based on, or designed from, a genomic or cDNA
15 complementary DNA or RNA in a particular cell or tissue. Oligonucleotides comprise portions of a nucleic acid sequence having about 10 nt, 50 nt, or 100 nt in length, preferably about 15 nt to 30 nt in length. In one embodiment, an oligonucleotide comprising a nucleic acid molecule less than 100 nt in length would further comprise at least 6 contiguous nucleotides of GenBank
Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843,
20 or a complement thereof. Oligonucleotides may be chemically synthesized and may be used as probes.

In another embodiment, an isolated nucleic acid molecule of the invention comprises a nucleic acid molecule that is a complement of the nucleotide sequences shown in GenBank
Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843,
25 or a portion of this nucleotide sequence. A nucleic acid molecule that is complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 is one that is sufficiently complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 that it can hydrogen bond with little or no

mismatches to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, thereby forming a stable duplex.

As used herein, the term "complementary" refers to Watson-Crick or Hoogsteen base pairing between nucleotide units of a nucleic acid molecule, and the term "binding" means the physical or chemical interaction between two polypeptides or compounds or associated polypeptides or compounds or combinations thereof. Binding includes ionic, non-ionic, Von der Waals, hydrophobic interactions, etc. A physical interaction can be either direct or indirect. Indirect interactions may be through or due to the effects of another polypeptide or compound. Direct binding refers to interactions that do not take place through, or due to, the effect of another polypeptide or compound, but instead are without other substantial chemical intermediates.

Moreover, the nucleic acid molecule of the invention can comprise only a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, *e.g.*, a fragment that can be used as a probe or primer, or a fragment encoding a biologically active portion of ORX. Fragments provided herein are defined as sequences of at least 6 (contiguous) nucleic acids or at least 4 (contiguous) amino acids, a length sufficient to allow for specific hybridization in the case of nucleic acids or for specific recognition of an epitope in the case of amino acids, respectively, and are at most some portion less than a full length sequence. Fragments may be derived from any contiguous portion of a nucleic acid or amino acid sequence of choice. Derivatives are nucleic acid sequences or amino acid sequences formed from the native compounds either directly or by modification or partial substitution. Analogs are nucleic acid sequences or amino acid sequences that have a structure similar to, but not identical to, the native compound but differs from it in respect to certain components or side chains. Analogs may be synthetic or from a different evolutionary origin and may have a similar or opposite metabolic activity compared to wild type.

Derivatives and analogs may be full length or other than full length, if the derivative or analog contains a modified nucleic acid or amino acid, as described below. Derivatives or analogs of the nucleic acids or proteins of the invention include, but are not limited to, molecules comprising regions that are substantially homologous to the nucleic acids or proteins of the invention, in various embodiments, by at least about 70%, 80%, 85%, 90%, 95%, 98%, or even 99% identity (with a preferred identity of 80-99%) over a nucleic acid or amino acid sequence of

identical size or when compared to an aligned sequence in which the alignment is done by a computer homology program known in the art, or whose encoding nucleic acid is capable of hybridizing to the complement of a sequence encoding the aforementioned proteins under stringent, moderately stringent, or low stringent conditions. See *e.g.* Ausubel, *et al.*, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993, and below. An exemplary program is the Gap program (Wisconsin Sequence Analysis Package, Version 8 for UNIX, Genetics Computer Group, University Research Park, Madison, WI) using the default settings, which uses the algorithm of Smith and Waterman (Adv. Appl. Math., 1981, 2: 482-489, which is incorporated herein by reference in its entirety).

A "homologous nucleic acid sequence" or "homologous amino acid sequence," or variations thereof, refer to sequences characterized by a homology at the nucleotide level or amino acid level as discussed above. Homologous nucleotide sequences encode those sequences coding for isoforms of an ORX polypeptide. Isoforms can be expressed in different tissues of the same organism as a result of, for example, alternative splicing of RNA. Alternatively, isoforms can be encoded by different genes. In the present invention, homologous nucleotide sequences include nucleotide sequences encoding for an ORX polypeptide of species other than humans, including, but not limited to, mammals, and thus can include, *e.g.*, mouse, rat, rabbit, dog, cat, cow, horse, and other organisms. Homologous nucleotide sequences also include, but are not limited to, naturally occurring allelic variations and mutations of the nucleotide sequences set forth herein. A homologous nucleotide sequence does not, however, include the nucleotide sequence encoding human ORX protein. Homologous nucleic acid sequences include those nucleic acid sequences that encode conservative amino acid substitutions (see below) in the amino acid sequence of an ORX polypeptide, as well as a polypeptide having ORX activity. Biological activities of the ORX proteins are described below. A homologous amino acid sequence does not encode the amino acid sequence of a human ORX polypeptide.

The nucleotide sequence determined from the cloning of the human ORX gene allows for the generation of probes and primers designed for use in identifying and/or cloning ORX homologues in other cell types, *e.g.*, from other tissues, as well as ORX homologues from other mammals. The probe/primer typically comprises a substantially purified oligonucleotide. The oligonucleotide typically comprises a region of nucleotide sequence that hybridizes under

stringent conditions to at least about 12, 25, 50, 100, 150, 200, 250, 300, 350 or 400 or more consecutive sense strand nucleotide sequences of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or an anti-sense strand nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or of a naturally occurring mutant of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

Probes based on the human ORX nucleotide sequence can be used to detect transcripts or genomic sequences encoding the same or homologous proteins. In various embodiments, the probe further comprises a label group attached thereto, *e.g.*, the label group can be a radioisotope, a fluorescent compound, an enzyme, or an enzyme co-factor. Such probes can be used as a part of a diagnostic test kit for identifying cells or tissue which misexpress an ORX protein, such as by measuring a level of an ORX-encoding nucleic acid in a sample of cells from a subject *e.g.*, detecting ORX mRNA levels or determining whether a genomic ORX gene has been mutated or deleted.

A "polypeptide having a biologically active portion of ORX" refers to polypeptides exhibiting activity similar, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular biological assay, with or without dose dependency. A nucleic acid fragment encoding a "biologically active portion of ORX" can be prepared by isolating a portion of an ORX nucleic acid that encodes a polypeptide having an ORX biological activity (biological activities of the ORX proteins are described below), expressing the encoded portion of ORX protein (*e.g.*, by recombinant expression *in vitro*) and assessing the activity of the encoded portion of ORX. For example, a nucleic acid fragment encoding a biologically active portion of ORX can optionally include an ATP-binding domain. In another embodiment, a nucleic acid fragment encoding a biologically active portion of ORX includes one or more regions.

ORX Variants

The invention further encompasses nucleic acid molecules that differ from the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 due to the degeneracy of the genetic code. These nucleic acid

molecules thus encode the same ORX protein as that encoded by the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 *e.g.*, the ORX polypeptides.

In addition to the human ORX nucleic acids, it will be appreciated by those skilled in the art that DNA sequence polymorphisms that lead to changes in the amino acid sequences of ORX may exist within a population (*e.g.*, the human population). Such genetic polymorphism in the ORX gene may exist among individuals within a population due to natural allelic variation. As used herein, the terms "gene" and "recombinant gene" refer to nucleic acid molecules comprising an open reading frame encoding an ORX protein, preferably a mammalian ORX protein. Such natural allelic variations can typically result in 1-5% variance in the nucleotide sequence of the ORX gene. Any and all such nucleotide variations and resulting amino acid polymorphisms in ORX that are the result of natural allelic variation and that do not alter the functional activity of ORX are intended to be within the scope of the invention.

Moreover, nucleic acid molecules encoding ORX proteins from other species, and thus that have a nucleotide sequence that differs from the human sequence of the ORX nucleic acid molecules are intended to be within the scope of the invention. Nucleic acid molecules corresponding to natural allelic variants and homologues of the ORX cDNAs of the invention can be isolated based on their homology to the human ORX nucleic acids disclosed herein using the human cDNAs, or a portion thereof, as a hybridization probe according to standard hybridization techniques under stringent hybridization conditions. For example, a soluble human ORX cDNA can be isolated based on its homology to human membrane-bound ORX. Likewise, a membrane-bound human ORX cDNA can be isolated based on its homology to soluble human ORX.

Accordingly, in another embodiment, an isolated nucleic acid molecule of the invention is at least 6 nucleotides in length and hybridizes under stringent conditions to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. In another embodiment, the nucleic acid is at least 10, 25, 50, 100, 250, 500 or 750 nucleotides in length. In another embodiment, an isolated nucleic acid molecule of the invention hybridizes to the coding region. As used herein, the term "hybridizes under stringent conditions" is intended to describe

conditions for hybridization and washing under which nucleotide sequences at least 60% homologous to each other typically remain hybridized to each other.

Homologs (*i.e.*, nucleic acids encoding ORX proteins derived from species other than human) or other related sequences (*e.g.*, paralogs) can be obtained by low, moderate or high stringency hybridization with all or a portion of the particular human sequence as a probe using methods well known in the art for nucleic acid hybridization and cloning.

As used herein, the phrase "stringent hybridization conditions" refers to conditions under which a probe, primer or oligonucleotide will hybridize to its target sequence, but to no other sequences. Stringent conditions are sequence-dependent and will be different in different circumstances. Longer sequences hybridize specifically at higher temperatures than shorter sequences. Generally, stringent conditions are selected to be about 5 °C lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength and pH. The T_m is the temperature (under defined ionic strength, pH and nucleic acid concentration) at which 50% of the probes complementary to the target sequence hybridize to the target sequence at equilibrium. Since the target sequences are generally present at excess, at T_m , 50% of the probes are occupied at equilibrium. Typically, stringent conditions will be those in which the salt concentration is less than about 1.0 M sodium ion, typically about 0.01 to 1.0 M sodium ion (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30 °C for short probes, primers or oligonucleotides (*e.g.*, 10 nt to 50 nt) and at least about 60°C for longer probes, primers and oligonucleotides. Stringent conditions may also be achieved with the addition of destabilizing agents, such as formamide.

Stringent conditions are known to those skilled in the art and can be found in CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, N.Y. (1989), 6.3.1-6.3.6. Preferably, the conditions are such that sequences at least about 65%, 70%, 75%, 85%, 90%, 95%, 98%, or 99% homologous to each other typically remain hybridized to each other. A non-limiting example of stringent hybridization conditions is hybridization in a high salt buffer comprising 6X SSC, 50 mM Tris-HCl (pH 7.5), 1 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.02% BSA, and 500 mg/ml denatured salmon sperm DNA at 65 °C. This hybridization is followed by one or more washes in 0.2X SSC, 0.01% BSA at 50 °C. An isolated nucleic acid molecule of the invention that hybridizes under stringent conditions to the sequence of GenBank Accession Numbers

AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 corresponds to a naturally occurring nucleic acid molecule. As used herein, a "naturally-occurring" nucleic acid molecule refers to an RNA or DNA molecule having a nucleotide sequence that occurs in nature (*e.g.*, encodes a natural protein).

5 In a second embodiment, a nucleic acid sequence that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of moderate stringency is provided. A non-limiting example of moderate stringency hybridization conditions are hybridization in 6X SSC, 5X
10 Denhardt's solution, 0.5% SDS and 100 mg/ml denatured salmon sperm DNA at 55°C, followed by one or more washes in 1X SSC, 0.1% SDS at 37 °C. Other conditions of moderate stringency that may be used are well known in the art. See, *e.g.*, Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY.

15 In a third embodiment, a nucleic acid that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of low stringency, is provided. A non-limiting example of low stringency hybridization conditions are hybridization in 35% formamide, 5X SSC, 50 mM
20 Tris-HCl (pH 7.5), 5 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.2% BSA, 100 mg/ml denatured salmon sperm DNA, 10% (wt/vol) dextran sulfate at 40 °C, followed by one or more washes in 2X SSC, 25 mM Tris-HCl (pH 7.4), 5 mM EDTA, and 0.1% SDS at 50 °C. Other conditions of low stringency that may be used are well known in the art (*e.g.*, as employed for cross-species hybridizations). See, *e.g.*, Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR
25 BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY; Shilo and Weinberg, 1981, *Proc Natl Acad Sci USA* 78: 6789-6792.

Conservative mutations

In addition to naturally-occurring allelic variants of the ORX sequence that may exist in the population, the skilled artisan will further appreciate that changes can be introduced by mutation into the nucleotide sequence of the ORX nucleic acid molecules, thereby leading to changes in the amino acid sequence of the encoded ORX protein, without altering the functional ability of the ORX protein. For example, nucleotide substitutions leading to amino acid substitutions at "non-essential" amino acid residues can be made in the sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. A "non-essential" amino acid residue is a residue that can be altered from the wild-type sequence of ORX without altering the biological activity, whereas an "essential" amino acid residue is required for biological activity. For example, amino acid residues that are conserved among the ORX proteins of the present invention, are predicted to be particularly unamenable to alteration.

Another aspect of the invention pertains to nucleic acid molecules encoding ORX proteins that contain changes in amino acid residues that are not essential for activity. Such ORX proteins differ in amino acid sequence from the ORX polypeptides, yet retain biological activity. In one embodiment, the isolated nucleic acid molecule comprises a nucleotide sequence encoding a protein, wherein the protein comprises an amino acid sequence at least about 75% homologous to the amino acid sequence of the ORX polypeptides. Preferably, the protein encoded by the nucleic acid is at least about 80% homologous to the sequence of an ORX polypeptide, more preferably at least about 90%, 95%, 98%, and most preferably at least about 99% homologous to the sequence of an ORX polypeptide.

An isolated nucleic acid molecule encoding an ORX protein homologous to the protein of can be created by introducing one or more nucleotide substitutions, additions or deletions into the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, such that one or more amino acid substitutions, additions or deletions are introduced into the encoded protein.

Mutations can be introduced into the nucleotide sequence of the ORX nucleic acid molecules by standard techniques, such as site-directed mutagenesis and PCR-mediated mutagenesis. Preferably, conservative amino acid substitutions are made at one or more predicted non-essential amino acid residues. A "conservative amino acid substitution" is one in

which the amino acid residue is replaced with an amino acid residue having a similar side chain. Families of amino acid residues having similar side chains have been defined in the art. These families include amino acids with basic side chains (*e.g.*, lysine, arginine, histidine), acidic side chains (*e.g.*, aspartic acid, glutamic acid), uncharged polar side chains (*e.g.*, glycine, asparagine, glutamine, serine, threonine, tyrosine, cysteine), nonpolar side chains (*e.g.*, alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan), beta-branched side chains (*e.g.*, threonine, valine, isoleucine) and aromatic side chains (*e.g.*, tyrosine, phenylalanine, tryptophan, histidine). Thus, a predicted nonessential amino acid residue in ORX is replaced with another amino acid residue from the same side chain family. Alternatively, in another embodiment, mutations can be introduced randomly along all or part of an ORX coding sequence, such as by saturation mutagenesis, and the resultant mutants can be screened for ORX biological activity to identify mutants that retain activity. Following mutagenesis of the ORX nucleic acid molecule, the encoded protein can be expressed by any recombinant technology known in the art and the activity of the protein can be determined.

In one embodiment, a mutant ORX protein can be assayed for (1) the ability to form protein:protein interactions with other ORX proteins, other cell-surface proteins, or biologically active portions thereof, (2) complex formation between a mutant ORX protein and an ORX receptor; (3) the ability of a mutant ORX protein to bind to an intracellular target protein or biologically active portion thereof; (*e.g.*, avidin proteins); (4) the ability to bind ORX protein; or (5) the ability to specifically bind an anti-ORX protein antibody.

Antisense ORX Nucleic Acids

Another aspect of the invention pertains to isolated antisense nucleic acid molecules that are hybridizable to or complementary to the nucleic acid molecule comprising the nucleotide sequence of the ORX nucleic acid molecule, or fragments, analogs or derivatives thereof. An "antisense" nucleic acid comprises a nucleotide sequence that is complementary to a "sense" nucleic acid encoding a protein, *e.g.*, complementary to the coding strand of a double-stranded cDNA molecule or complementary to an mRNA sequence. In specific aspects, antisense nucleic acid molecules are provided that comprise a sequence complementary to at least about 10, 25, 50, 100, 250 or 500 nucleotides or an entire ORX coding strand, or to only a portion thereof.

Nucleic acid molecules encoding fragments, homologs, derivatives and analogs of an ORX protein or antisense nucleic acids complementary to an ORX nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 are additionally provided.

5 In one embodiment, an antisense nucleic acid molecule is antisense to a "coding region" of the coding strand of a nucleotide sequence encoding ORX. The term "coding region" refers to the region of the nucleotide sequence comprising codons which are translated into amino acid residues. In another embodiment, the antisense nucleic acid molecule is antisense to a "noncoding region" of the coding strand of a nucleotide sequence encoding ORX. The term
10 "noncoding region" refers to 5' and 3' sequences which flank the coding region that are not translated into amino acids (*i.e.*, also referred to as 5' and 3' untranslated regions).

Given the coding strand sequences encoding ORX disclosed herein, antisense nucleic acids of the invention can be designed according to the rules of Watson and Crick or Hoogsteen base pairing. The antisense nucleic acid molecule can be complementary to the entire coding region of ORX mRNA, but more preferably is an oligonucleotide that is antisense to only a portion of the coding or noncoding region of ORX mRNA. For example, the antisense oligonucleotide can be complementary to the region surrounding the translation start site of ORX mRNA. An antisense oligonucleotide can be, for example, about 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 nucleotides in length. An antisense nucleic acid of the invention can be constructed using
15 chemical synthesis or enzymatic ligation reactions using procedures known in the art. For example, an antisense nucleic acid (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and
20 acridine substituted nucleotides can be used.

Examples of modified nucleotides that can be used to generate the antisense nucleic acid include: 5-fluorouracil, 5-bromouracil, 5-chlorouracil, 5-iodouracil, hypoxanthine, xanthine, 4-acetylcytosine, 5-(carboxyhydroxymethyl) uracil, 5-carboxymethylaminomethyl-
2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine,
30 inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine,

2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine, 7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5'-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5-oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine. Alternatively, the antisense nucleic acid can be produced biologically using an expression vector into which a nucleic acid has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the inserted nucleic acid will be of an antisense orientation to a target nucleic acid of interest, described further in the following subsection).

The antisense nucleic acid molecules of the invention are typically administered to a subject or generated *in situ* such that they hybridize with or bind to cellular mRNA and/or genomic DNA encoding an ORX protein to thereby inhibit expression of the protein, *e.g.*, by inhibiting transcription and/or translation. The hybridization can be by conventional nucleotide complementarity to form a stable duplex, or, for example, in the case of an antisense nucleic acid molecule that binds to DNA duplexes, through specific interactions in the major groove of the double helix. An example of a route of administration of antisense nucleic acid molecules of the invention includes direct injection at a tissue site. Alternatively, antisense nucleic acid molecules can be modified to target selected cells and then administered systemically. For example, for systemic administration, antisense molecules can be modified such that they specifically bind to receptors or antigens expressed on a selected cell surface, *e.g.*, by linking the antisense nucleic acid molecules to peptides or antibodies that bind to cell surface receptors or antigens. The antisense nucleic acid molecules can also be delivered to cells using the vectors described herein. To achieve sufficient intracellular concentrations of antisense molecules, vector constructs in which the antisense nucleic acid molecule is placed under the control of a strong pol II or pol III promoter are preferred.

In yet another embodiment, the antisense nucleic acid molecule of the invention is an α -anomeric nucleic acid molecule. An α -anomeric nucleic acid molecule forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual β -units, the

strands run parallel to each other (Gaultier *et al.* (1987) *Nucleic Acids Res* 15: 6625-6641). The antisense nucleic acid molecule can also comprise a 2'-o-methylribonucleotide (Inoue *et al.* (1987) *Nucleic Acids Res* 15: 6131-6148) or a chimeric RNA -DNA analogue (Inoue *et al.* (1987) *FEBS Lett* 215: 327-330).

Such modifications include, by way of nonlimiting example, modified bases, and nucleic acids whose sugar phosphate backbones are modified or derivatized. These modifications are carried out at least in part to enhance the chemical stability of the modified nucleic acid, such that they may be used, for example, as antisense binding nucleic acids in therapeutic applications in a subject.

ORX Ribozymes and PNA moieties

In still another embodiment, an antisense nucleic acid of the invention is a ribozyme. Ribozymes are catalytic RNA molecules with ribonuclease activity that are capable of cleaving a single-stranded nucleic acid, such as a mRNA, to which they have a complementary region. Thus, ribozymes (*e.g.*, hammerhead ribozymes (described in Haselhoff and Gerlach (1988) *Nature* 334:585-591)) can be used to catalytically cleave ORX mRNA transcripts to thereby inhibit translation of ORX mRNA. A ribozyme having specificity for an ORX-encoding nucleic acid can be designed based upon the nucleotide sequence of an ORX DNA disclosed herein. For example, a derivative of a Tetrahymena L-19 IVS RNA can be constructed in which the nucleotide sequence of the active site is complementary to the nucleotide sequence to be cleaved in an ORX-encoding mRNA. See, *e.g.*, Cech *et al.* U.S. Pat. No. 4,987,071; and Cech *et al.* U.S. Pat. No. 5,116,742. Alternatively, ORX mRNA can be used to select a catalytic RNA having a specific ribonuclease activity from a pool of RNA molecules. See, *e.g.*, Bartel *et al.*, (1993) *Science* 261:1411-1418.

Alternatively, ORX gene expression can be inhibited by targeting nucleotide sequences complementary to the regulatory region of the ORX (*e.g.*, the ORX promoter and/or enhancers) to form triple helical structures that prevent transcription of the ORX gene in target cells. See generally, Helene. (1991) *Anticancer Drug Des.* 6: 569-84; Helene. *et al.* (1992) *Ann. N.Y. Acad. Sci.* 660:27-36; and Maher (1992) *Bioassays* 14: 807-15.

In various embodiments, the nucleic acids of ORX can be modified at the base moiety, sugar moiety or phosphate backbone to improve, *e.g.*, the stability, hybridization, or solubility of the molecule. For example, the deoxyribose phosphate backbone of the nucleic acids can be modified to generate peptide nucleic acids (see Hyrup *et al.* (1996) *Bioorg Med Chem* 4: 5-23).

As used herein, the terms "peptide nucleic acids" or "PNAs" refer to nucleic acid mimics, *e.g.*, DNA mimics, in which the deoxyribose phosphate backbone is replaced by a pseudopeptide backbone and only the four natural nucleobases are retained. The neutral backbone of PNAs has been shown to allow for specific hybridization to DNA and RNA under conditions of low ionic strength. The synthesis of PNA oligomers can be performed using standard solid phase peptide synthesis protocols as described in Hyrup *et al.* (1996) above; Perry-O'Keefe *et al.* (1996) *PNAS* 93: 14670-675.

PNAs of ORX can be used in therapeutic and diagnostic applications. For example, PNAs can be used as antisense or antigene agents for sequence-specific modulation of gene expression by, *e.g.*, inducing transcription or translation arrest or inhibiting replication. PNAs of ORX can also be used, *e.g.*, in the analysis of single base pair mutations in a gene by, *e.g.*, PNA directed PCR clamping; as artificial restriction enzymes when used in combination with other enzymes, *e.g.*, S1 nucleases (Hyrup B. (1996) above); or as probes or primers for DNA sequence and hybridization (Hyrup *et al.* (1996), above; Perry-O'Keefe (1996), above).

In another embodiment, PNAs of ORX can be modified, *e.g.*, to enhance their stability or cellular uptake, by attaching lipophilic or other helper groups to PNA, by the formation of PNA-DNA chimeras, or by the use of liposomes or other techniques of drug delivery known in the art. For example, PNA-DNA chimeras of ORX can be generated that may combine the advantageous properties of PNA and DNA. Such chimeras allow DNA recognition enzymes, *e.g.*, RNase H and DNA polymerases, to interact with the DNA portion while the PNA portion would provide high binding affinity and specificity. PNA-DNA chimeras can be linked using linkers of appropriate lengths selected in terms of base stacking, number of bonds between the nucleobases, and orientation (Hyrup (1996) above). The synthesis of PNA-DNA chimeras can be performed as described in Hyrup (1996) above and Finn *et al.* (1996) *Nucl Acids Res* 24: 3357-63. For example, a DNA chain can be synthesized on a solid support using standard phosphoramidite coupling chemistry, and modified nucleoside analogs, *e.g.*, 5'-(4-methoxytrityl)

amino-5'-deoxy-thymidine phosphoramidite, can be used between the PNA and the 5' end of DNA (Mag *et al.* (1989) *Nucl Acid Res* 17: 5973-88). PNA monomers are then coupled in a stepwise manner to produce a chimeric molecule with a 5' PNA segment and a 3' DNA segment (Finn *et al.* (1996) above). Alternatively, chimeric molecules can be synthesized with a 5' DNA segment and a 3' PNA segment. See, Petersen *et al.* (1975) *Bioorg Med Chem Lett* 5: 1119-11124.

In other embodiments, the oligonucleotide may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, *e.g.*, Letsinger *et al.*, 1989, *Proc. Natl. Acad. Sci. U.S.A.* 86:6553-6556; Lemaitre *et al.*, 1987, *Proc. Natl. Acad. Sci.* 84:648-652; PCT Publication No. W088/09810) or the blood-brain barrier (see, *e.g.*, PCT Publication No. W089/10134). In addition, oligonucleotides can be modified with hybridization triggered cleavage agents (See, *e.g.*, Krol *et al.*, 1988, *BioTechniques* 6:958-976) or intercalating agents. (See, *e.g.*, Zon, 1988, *Pharm. Res.* 5: 539-549). To this end, the oligonucleotide may be conjugated to another molecule, *e.g.*, a peptide, a hybridization triggered cross-linking agent, a transport agent, a hybridization-triggered cleavage agent, etc.

ORX Polypeptides

An ORX polypeptide of the invention includes the ORX-like protein whose sequence is provided in GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989. The invention also includes a mutant or variant protein any of whose residues may be changed from the corresponding residue of the ORX polypeptide while still encoding a protein that maintains its ORX-like activities and

physiological functions, or a functional fragment thereof. In some embodiments, up to 20% or more of the residues may be so changed in the mutant or variant protein. In some embodiments, the ORX polypeptide according to the invention is a mature polypeptide.

In general, an ORX -like variant that preserves ORX-like function includes any variant in which residues at a particular position in the sequence have been substituted by other amino acids, and further include the possibility of inserting an additional residue or residues between two residues of the parent protein as well as the possibility of deleting one or more residues from the parent sequence. Any amino acid substitution, insertion, or deletion is encompassed by the invention. In favorable circumstances, the substitution is a conservative substitution as defined above.

One aspect of the invention pertains to isolated ORX proteins, and biologically active portions thereof, or derivatives, fragments, analogs or homologs thereof. Also provided are polypeptide fragments suitable for use as immunogens to raise anti-ORX antibodies. In one embodiment, native ORX proteins can be isolated from cells or tissue sources by an appropriate purification scheme using standard protein purification techniques. In another embodiment, ORX proteins are produced by recombinant DNA techniques. Alternative to recombinant expression, an ORX protein or polypeptide can be synthesized chemically using standard peptide synthesis techniques.

An "isolated" or "purified" protein or biologically active portion thereof is substantially free of cellular material or other contaminating proteins from the cell or tissue source from which the ORX protein is derived, or substantially free from chemical precursors or other chemicals when chemically synthesized. The language "substantially free of cellular material" includes preparations of ORX protein in which the protein is separated from cellular components of the cells from which it is isolated or recombinantly produced. In one embodiment, the language "substantially free of cellular material" includes preparations of ORX protein having less than about 30% (by dry weight) of non-ORX protein (also referred to herein as a "contaminating protein"), more preferably less than about 20% of non-ORX protein, still more preferably less than about 10% of non-ORX protein, and most preferably less than about 5% non-ORX protein. When the ORX protein or biologically active portion thereof is recombinantly produced, it is also preferably substantially free of culture medium, *i.e.*, culture medium represents less than about

20%, more preferably less than about 10%, and most preferably less than about 5% of the volume of the protein preparation.

The language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein in which the protein is separated from chemical precursors or other chemicals that are involved in the synthesis of the protein. In one embodiment, the language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein having less than about 30% (by dry weight) of chemical precursors or non-ORX chemicals, more preferably less than about 20% chemical precursors or non-ORX chemicals, still more preferably less than about 10% chemical precursors or non-ORX chemicals, and most preferably less than about 5% chemical precursors or non-ORX chemicals.

Biologically active portions of an ORX protein include peptides comprising amino acid sequences sufficiently homologous to or derived from the amino acid sequence of the ORX protein, *e.g.*, the amino acid sequence of the ORX polypeptides that include fewer amino acids than the full length ORX proteins, and exhibit at least one activity of an ORX protein. Typically, biologically active portions comprise a domain or motif with at least one activity of the ORX protein. A biologically active portion of an ORX protein can be a polypeptide which is, for example, 10, 25, 50, 100 or more amino acids in length.

In some embodiments, an ORX protein of the invention includes the amino acid sequence of the herein described polypeptide and a number of amino acids on the amino terminus of the ORX protein, the carboxy terminus of the ORX protein, or a number of amino acids on both termini of the disclosed ORX protein. Thus, the ORX protein can include 1, 2, 3, 4, 5, 10, 15, 20, 25, 50, or 75 or more amino acids on the amino terminus, the carboxy terminus, or both termini of the disclosed amino acid sequence.

A biologically active portion of an ORX protein of the present invention may contain at least one of the above-identified domains conserved between the ORX proteins, *e.g.* TSR modules. Moreover, other biologically active portions, in which other regions of the protein are deleted, can be prepared by recombinant techniques and evaluated for one or more of the functional activities of a native ORX protein.

In an embodiment, the ORX protein has an amino acid sequence of an ORX polypeptides. In other embodiments, the ORX protein is substantially homologous to an ORX polypeptide and

retains the functional activity of the ORX polypeptide yet differs in amino acid sequence due to natural allelic variation or mutagenesis, as described in detail below. Accordingly, in another embodiment, the ORX protein is a protein that comprises an amino acid sequence at least about 45% homologous to the amino acid sequence of an ORX polypeptide and retains the functional activity of the ORX polypeptides.

Determining homology between two or more sequence

To determine the percent homology of two amino acid sequences or of two nucleic acids, the sequences are aligned for optimal comparison purposes (*e.g.*, gaps can be introduced in either of the sequences being compared for optimal alignment between the sequences). The amino acid residues or nucleotides at corresponding amino acid positions or nucleotide positions are then compared. When a position in the first sequence is occupied by the same amino acid residue or nucleotide as the corresponding position in the second sequence, then the molecules are homologous at that position (*i.e.*, as used herein amino acid or nucleic acid "homology" is equivalent to amino acid or nucleic acid "identity").

The nucleic acid sequence homology may be determined as the degree of identity between two sequences. The homology may be determined using computer programs known in the art, such as GAP software provided in the GCG program package. See, *Needleman and Wunsch* 1970 *J Mol Biol* 48: 443-453. Using GCG GAP software with the following settings for nucleic acid sequence comparison: GAP creation penalty of 5.0 and GAP extension penalty of 0.3, the coding region of the analogous nucleic acid sequences referred to above exhibits a degree of identity preferably of at least 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 99%, with the CDS (encoding) part of the DNA sequence shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

The term "sequence identity" refers to the degree to which two polynucleotide or polypeptide sequences are identical on a residue-by-residue basis over a particular region of comparison. The term "percentage of sequence identity" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical nucleic acid base (*e.g.*, A, T, C, G, U, or I, in the case of nucleic acids) occurs in both sequences to yield the number of matched positions, dividing the number of

matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of sequence identity. The term "substantial identity" as used herein denotes a characteristic of a polynucleotide sequence, wherein the polynucleotide comprises a sequence that has at least 80 percent sequence identity, preferably at least 85 percent identity and often 90 to 95 percent sequence identity, more usually at least 99 percent sequence identity as compared to a reference sequence over a comparison region. The term "percentage of positive residues" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical and conservative amino acid substitutions, as defined above, occur in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of positive residues.

Chimeric and fusion proteins

The invention also provides ORX chimeric or fusion proteins. As used herein, an ORX "chimeric protein" or "fusion protein" comprises an ORX polypeptide operatively linked to a non-ORX polypeptide. An "ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to ORX, whereas a "non-ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to a protein that is not substantially homologous to the ORX protein, *e.g.*, a protein that is different from the ORX protein and that is derived from the same or a different organism. Within an ORX fusion protein the ORX polypeptide can correspond to all or a portion of an ORX protein. In one embodiment, an ORX fusion protein comprises at least one biologically active portion of an ORX protein. In another embodiment, an ORX fusion protein comprises at least two biologically active portions of an ORX protein. Within the fusion protein, the term "operatively linked" is intended to indicate that the ORX polypeptide and the non-ORX polypeptide are fused in-frame to each other. The non-ORX polypeptide can be fused to the N-terminus or C-terminus of the ORX polypeptide.

For example, in one embodiment an ORX fusion protein comprises an ORX polypeptide operably linked to the extracellular domain of a second protein. Such fusion proteins can be

further utilized in screening assays for compounds that modulate ORX activity (such assays are described in detail below).

In another embodiment, the fusion protein is a GST-ORX fusion protein in which the ORX sequences are fused to the C-terminus of the GST (*i.e.*, glutathione S-transferase) sequences. Such fusion proteins can facilitate the purification of recombinant ORX.

In another embodiment, the fusion protein is an ORX-immunoglobulin fusion protein in which the ORX sequences comprising one or more domains are fused to sequences derived from a member of the immunoglobulin protein family. The ORX-immunoglobulin fusion proteins of the invention can be incorporated into pharmaceutical compositions and administered to a subject to inhibit an interaction between an ORX ligand and an ORX protein on the surface of a cell, to thereby suppress ORX-mediated signal transduction *in vivo*. In one nonlimiting example, a contemplated ORX ligand of the invention is the ORX receptor. The ORX-immunoglobulin fusion proteins can be used to affect the bioavailability of an ORX cognate ligand. Inhibition of the ORX ligand/ORX interaction may be useful therapeutically for both the treatment of proliferative and differentiative disorders, *e.g.*, cancer as well as modulating (*e.g.*, promoting or inhibiting) cell survival. Moreover, the ORX-immunoglobulin fusion proteins of the invention can be used as immunogens to produce anti-ORX antibodies in a subject, to purify ORX ligands, and in screening assays to identify molecules that inhibit the interaction of ORX with an ORX ligand.

An ORX chimeric or fusion protein of the invention can be produced by standard recombinant DNA techniques. For example, DNA fragments coding for the different polypeptide sequences are ligated together in-frame in accordance with conventional techniques, *e.g.*, by employing blunt-ended or stagger-ended termini for ligation, restriction enzyme digestion to provide for appropriate termini, filling-in of cohesive ends as appropriate, alkaline phosphatase treatment to avoid undesirable joining, and enzymatic ligation. In another embodiment, the fusion gene can be synthesized by conventional techniques including automated DNA synthesizers. Alternatively, PCR amplification of gene fragments can be carried out using anchor primers that give rise to complementary overhangs between two consecutive gene fragments that can subsequently be annealed and reamplified to generate a chimeric gene sequence (see, for example, Ausubel et al. (eds.) CURRENT PROTOCOLS IN MOLECULAR BIOLOGY,

John Wiley & Sons, 1992). Moreover, many expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST polypeptide). An ORX-encoding nucleic acid can be cloned into such an expression vector such that the fusion moiety is linked in-frame to the ORX protein.

5

ORX agonists and antagonists

The present invention also pertains to variants of the ORX proteins that function as either ORX agonists (mimetics) or as ORX antagonists. Variants of the ORX protein can be generated by mutagenesis, *e.g.*, discrete point mutation or truncation of the ORX protein. An agonist of the ORX protein can retain substantially the same, or a subset of, the biological activities of the naturally occurring form of the ORX protein. An antagonist of the ORX protein can inhibit one or more of the activities of the naturally occurring form of the ORX protein by, for example, competitively binding to a downstream or upstream member of a cellular signaling cascade which includes the ORX protein. Thus, specific biological effects can be elicited by treatment with a variant of limited function. In one embodiment, treatment of a subject with a variant having a subset of the biological activities of the naturally occurring form of the protein has fewer side effects in a subject relative to treatment with the naturally occurring form of the ORX proteins.

Variants of the ORX protein that function as either ORX agonists (mimetics) or as ORX antagonists can be identified by screening combinatorial libraries of mutants, *e.g.*, truncation mutants, of the ORX protein for ORX protein agonist or antagonist activity. In one embodiment, a variegated library of ORX variants is generated by combinatorial mutagenesis at the nucleic acid level and is encoded by a variegated gene library. A variegated library of ORX variants can be produced by, for example, enzymatically ligating a mixture of synthetic oligonucleotides into gene sequences such that a degenerate set of potential ORX sequences is expressible as individual polypeptides, or alternatively, as a set of larger fusion proteins (*e.g.*, for phage display) containing the set of ORX sequences therein. There are a variety of methods which can be used to produce libraries of potential ORX variants from a degenerate oligonucleotide sequence. Chemical synthesis of a degenerate gene sequence can be performed in an automatic DNA synthesizer, and the synthetic gene then ligated into an appropriate expression vector. Use

of a degenerate set of genes allows for the provision, in one mixture, of all of the sequences encoding the desired set of potential ORX sequences. Methods for synthesizing degenerate oligonucleotides are known in the art (see, *e.g.*, Narang (1983) *Tetrahedron* 39:3; Itakura *et al.* (1984) *Annu Rev Biochem* 53:323; Itakura *et al.* (1984) *Science* 198:1056; Ike *et al.* (1983) *Nucl Acid Res* 11:477.

Polypeptide libraries

In addition, libraries of fragments of the ORX protein coding sequence can be used to generate a variegated population of ORX fragments for screening and subsequent selection of variants of an ORX protein. In one embodiment, a library of coding sequence fragments can be generated by treating a double stranded PCR fragment of an ORX coding sequence with a nuclease under conditions wherein nicking occurs only about once per molecule, denaturing the double stranded DNA, renaturing the DNA to form double stranded DNA that can include sense/antisense pairs from different nicked products, removing single stranded portions from reformed duplexes by treatment with S1 nuclease, and ligating the resulting fragment library into an expression vector. By this method, an expression library can be derived which encodes N-terminal and internal fragments of various sizes of the ORX protein.

Several techniques are known in the art for screening gene products of combinatorial libraries made by point mutations or truncation, and for screening cDNA libraries for gene products having a selected property. Such techniques are adaptable for rapid screening of the gene libraries generated by the combinatorial mutagenesis of ORX proteins. The most widely used techniques, which are amenable to high throughput analysis, for screening large gene libraries typically include cloning the gene library into replicable expression vectors, transforming appropriate cells with the resulting library of vectors, and expressing the combinatorial genes under conditions in which detection of a desired activity facilitates isolation of the vector encoding the gene whose product was detected. Recursive ensemble mutagenesis (REM), a new technique that enhances the frequency of functional mutants in the libraries, can be used in combination with the screening assays to identify ORX variants (Arkin and Yourvan (1992) *PNAS* 89:7811-7815; Delgrave *et al.* (1993) *Protein Engineering* 6:327-331).

ORX Antibodies

Also included in the invention are antibodies to ORX proteins, or fragments of ORX proteins. The term "antibody" as used herein refers to immunoglobulin molecules and immunologically active portions of immunoglobulin (Ig) molecules, *i.e.*, molecules that contain an antigen binding site that specifically binds (immunoreacts with) an antigen. Such antibodies include, but are not limited to, polyclonal, monoclonal, chimeric, single chain, F_{ab} , $F_{ab'}$ and $F_{(ab')_2}$ fragments, and an F_{ab} expression library. In general, an antibody molecule obtained from humans relates to any of the classes IgG, IgM, IgA, IgE and IgD, which differ from one another by the nature of the heavy chain present in the molecule. Certain classes have subclasses as well, such as IgG₁, IgG₂, and others. Furthermore, in humans, the light chain may be a kappa chain or a lambda chain. Reference herein to antibodies includes a reference to all such classes, subclasses and types of human antibody species.

An isolated ORX-related protein of the invention may be intended to serve as an antigen, or a portion or fragment thereof, and additionally can be used as an immunogen to generate antibodies that immunospecifically bind the antigen, using standard techniques for polyclonal and monoclonal antibody preparation. The full-length protein can be used or, alternatively, the invention provides antigenic peptide fragments of the antigen for use as immunogens. An antigenic peptide fragment comprises at least 6 amino acid residues of the amino acid sequence of the full length protein and encompasses an epitope thereof such that an antibody raised against the peptide forms a specific immune complex with the full length protein or with any fragment that contains the epitope. Preferably, the antigenic peptide comprises at least 10 amino acid residues, or at least 15 amino acid residues, or at least 20 amino acid residues, or at least 30 amino acid residues. Preferred epitopes encompassed by the antigenic peptide are regions of the protein that are located on its surface; commonly these are hydrophilic regions.

In certain embodiments of the invention, at least one epitope encompassed by the antigenic peptide is a region of ORX-related protein that is located on the surface of the protein, *e.g.*, a hydrophilic region. A hydrophobicity analysis of the human ORX-related protein sequence will indicate which regions of an ORX-related protein are particularly hydrophilic and, therefore, are likely to encode surface residues useful for targeting antibody production. As a means for targeting antibody production, hydropathy plots showing regions of hydrophilicity and

hydrophobicity may be generated by any method well known in the art, including, for example, the Kyte Doolittle or the Hopp Woods methods, either with or without Fourier transformation. See, *e.g.*, Hopp and Woods, 1981, *Proc. Nat. Acad. Sci. USA* 78: 3824-3828; Kyte and Doolittle 1982, *J. Mol. Biol.* 157: 105-142, each of which is incorporated herein by reference in its entirety. Antibodies that are specific for one or more domains within an antigenic protein, or derivatives, fragments, analogs or homologs thereof, are also provided herein.

A protein of the invention, or a derivative, fragment, analog, homolog or ortholog thereof, may be utilized as an immunogen in the generation of antibodies that immunospecifically bind these protein components.

Various procedures known within the art may be used for the production of polyclonal or monoclonal antibodies directed against a protein of the invention, or against derivatives, fragments, analogs homologs or orthologs thereof (see, for example, *Antibodies: A Laboratory Manual*, Harlow E, and Lane D, 1988, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, incorporated herein by reference). Some of these antibodies are discussed below.

Polyclonal Antibodies

For the production of polyclonal antibodies, various suitable host animals (*e.g.*, rabbit, goat, mouse or other mammal) may be immunized by one or more injections with the native protein, a synthetic variant thereof, or a derivative of the foregoing. An appropriate immunogenic preparation can contain, for example, the naturally occurring immunogenic protein, a chemically synthesized polypeptide representing the immunogenic protein, or a recombinantly expressed immunogenic protein. Furthermore, the protein may be conjugated to a second protein known to be immunogenic in the mammal being immunized. Examples of such immunogenic proteins include but are not limited to keyhole limpet hemocyanin, serum albumin, bovine thyroglobulin, and soybean trypsin inhibitor. The preparation can further include an adjuvant. Various adjuvants used to increase the immunological response include, but are not limited to, Freund's (complete and incomplete), mineral gels (*e.g.*, aluminum hydroxide), surface active substances (*e.g.*, lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, dinitrophenol, etc.), adjuvants usable in humans such as Bacille Calmette-Guerin and *Corynebacterium parvum*, or similar immunostimulatory agents. Additional examples of

adjuvants which can be employed include MPL-TDM adjuvant (monophosphoryl Lipid A, synthetic trehalose dicorynomycolate).

The polyclonal antibody molecules directed against the immunogenic protein can be isolated from the mammal (*e.g.*, from the blood) and further purified by well known techniques, such as affinity chromatography using protein A or protein G, which provide primarily the IgG fraction of immune serum. Subsequently, or alternatively, the specific antigen which is the target of the immunoglobulin sought, or an epitope thereof, may be immobilized on a column to purify the immune specific antibody by immunoaffinity chromatography. Purification of immunoglobulins is discussed, for example, by D. Wilkinson (*The Scientist*, published by The Scientist, Inc., Philadelphia PA, Vol. 14, No. 8 (April 17, 2000), pp. 25-28).

Monoclonal Antibodies

The term "monoclonal antibody" (MAb) or "monoclonal antibody composition", as used herein, refers to a population of antibody molecules that contain only one molecular species of antibody molecule consisting of a unique light chain gene product and a unique heavy chain gene product. In particular, the complementarity determining regions (CDRs) of the monoclonal antibody are identical in all the molecules of the population. MAbs thus contain an antigen binding site capable of immunoreacting with a particular epitope of the antigen characterized by a unique binding affinity for it.

Monoclonal antibodies can be prepared using hybridoma methods, such as those described by Kohler and Milstein, *Nature*, 256:495 (1975). In a hybridoma method, a mouse, hamster, or other appropriate host animal, is typically immunized with an immunizing agent to elicit lymphocytes that produce or are capable of producing antibodies that will specifically bind to the immunizing agent. Alternatively, the lymphocytes can be immunized *in vitro*.

The immunizing agent will typically include the protein antigen, a fragment thereof or a fusion protein thereof. Generally, either peripheral blood lymphocytes are used if cells of human origin are desired, or spleen cells or lymph node cells are used if non-human mammalian sources are desired. The lymphocytes are then fused with an immortalized cell line using a suitable fusing agent, such as polyethylene glycol, to form a hybridoma cell (Goding, *Monoclonal Antibodies: Principles and Practice*, Academic Press, (1986) pp. 59-103). Immortalized cell lines

are usually transformed mammalian cells, particularly myeloma cells of rodent, bovine and human origin. Usually, rat or mouse myeloma cell lines are employed. The hybridoma cells can be cultured in a suitable culture medium that preferably contains one or more substances that inhibit the growth or survival of the unfused, immortalized cells. For example, if the parental cells lack the enzyme hypoxanthine guanine phosphoribosyl transferase (HGPRT or HPRT), the culture medium for the hybridomas typically will include hypoxanthine, aminopterin, and thymidine ("HAT medium"), which substances prevent the growth of HGPRT-deficient cells.

Preferred immortalized cell lines are those that fuse efficiently, support stable high level expression of antibody by the selected antibody-producing cells, and are sensitive to a medium such as HAT medium. More preferred immortalized cell lines are murine myeloma lines, which can be obtained, for instance, from the Salk Institute Cell Distribution Center, San Diego, California and the American Type Culture Collection, Manassas, Virginia. Human myeloma and mouse-human heteromyeloma cell lines also have been described for the production of human monoclonal antibodies (Kozbor, J. Immunol., 133:3001 (1984); Brodeur et al., Monoclonal Antibody Production Techniques and Applications, Marcel Dekker, Inc., New York, (1987) pp. 51-63).

The culture medium in which the hybridoma cells are cultured can then be assayed for the presence of monoclonal antibodies directed against the antigen. Preferably, the binding specificity of monoclonal antibodies produced by the hybridoma cells is determined by immunoprecipitation or by an *in vitro* binding assay, such as radioimmunoassay (RIA) or enzyme-linked immunoabsorbent assay (ELISA). Such techniques and assays are known in the art. The binding affinity of the monoclonal antibody can, for example, be determined by the Scatchard analysis of Munson and Pollard, Anal. Biochem., 107:220 (1980). Preferably, antibodies having a high degree of specificity and a high binding affinity for the target antigen are isolated.

After the desired hybridoma cells are identified, the clones can be subcloned by limiting dilution procedures and grown by standard methods. Suitable culture media for this purpose include, for example, Dulbecco's Modified Eagle's Medium and RPMI-1640 medium. Alternatively, the hybridoma cells can be grown *in vivo* as ascites in a mammal.

The monoclonal antibodies secreted by the subclones can be isolated or purified from the culture medium or ascites fluid by conventional immunoglobulin purification procedures such as, for example, protein A-Sepharose, hydroxylapatite chromatography, gel electrophoresis, dialysis, or affinity chromatography.

5 The monoclonal antibodies can also be made by recombinant DNA methods, such as those described in U.S. Patent No. 4,816,567. DNA encoding the monoclonal antibodies of the invention can be readily isolated and sequenced using conventional procedures (*e.g.*, by using oligonucleotide probes that are capable of binding specifically to genes encoding the heavy and light chains of murine antibodies). The hybridoma cells of the invention serve as a preferred
10 source of such DNA. Once isolated, the DNA can be placed into expression vectors, which are then transfected into host cells such as simian COS cells, Chinese hamster ovary (CHO) cells, or myeloma cells that do not otherwise produce immunoglobulin protein, to obtain the synthesis of monoclonal antibodies in the recombinant host cells. The DNA also can be modified, for example, by substituting the coding sequence for human heavy and light chain constant domains
15 in place of the homologous murine sequences (U.S. Patent No. 4,816,567; Morrison, Nature 368, 812-13 (1994)) or by covalently joining to the immunoglobulin coding sequence all or part of the coding sequence for a non-immunoglobulin polypeptide. Such a non-immunoglobulin polypeptide can be substituted for the constant domains of an antibody of the invention, or can be substituted for the variable domains of one antigen-combining site of an antibody of the
20 invention to create a chimeric bivalent antibody.

Humanized Antibodies

The antibodies directed against the protein antigens of the invention can further comprise humanized antibodies or human antibodies. These antibodies are suitable for administration to
25 humans without engendering an immune response by the human against the administered immunoglobulin. Humanized forms of antibodies are chimeric immunoglobulins, immunoglobulin chains or fragments thereof (such as Fv, Fab, Fab', F(ab')₂ or other antigen-binding subsequences of antibodies) that are principally comprised of the sequence of a human immunoglobulin, and contain minimal sequence derived from a non-human immunoglobulin.
30 Humanization can be performed following the method of Winter and co-workers (Jones et al.,

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Nature, 321:522-525 (1986); Riechmann et al., Nature, 332:323-327 (1988); Verhoeyen et al.,
Science, 239:1534-1536 (1988)), by substituting rodent CDRs or CDR sequences for the
corresponding sequences of a human antibody. (See also U.S. Patent No. 5,225,539.) In some
instances, Fv framework residues of the human immunoglobulin are replaced by corresponding
non-human residues. Humanized antibodies can also comprise residues which are found neither
in the recipient antibody nor in the imported CDR or framework sequences. In general, the
humanized antibody will comprise substantially all of at least one, and typically two, variable
domains, in which all or substantially all of the CDR regions correspond to those of a non-human
immunoglobulin and all or substantially all of the framework regions are those of a human
immunoglobulin consensus sequence. The humanized antibody optimally also will comprise at
least a portion of an immunoglobulin constant region (Fc), typically that of a human
immunoglobulin (Jones et al., 1986; Riechmann et al., 1988; and Presta, Curr. Op. Struct. Biol.,
2:593-596 (1992)).

Human Antibodies

Fully human antibodies relate to antibody molecules in which essentially the entire
sequences of both the light chain and the heavy chain, including the CDRs, arise from human
genes. Such antibodies are termed "human antibodies", or "fully human antibodies" herein.
Human monoclonal antibodies can be prepared by the trioma technique; the human B-cell
hybridoma technique (see Kozbor, et al., 1983 Immunol Today 4: 72) and the EBV hybridoma
technique to produce human monoclonal antibodies (see Cole, et al., 1985 In: MONOCLONAL
ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96). Human monoclonal
antibodies may be utilized in the practice of the present invention and may be produced by using
human hybridomas (see Cote, et al., 1983. Proc Natl Acad Sci USA 80: 2026-2030) or by
transforming human B-cells with Epstein Barr Virus *in vitro* (see Cole, et al., 1985 In:
MONOCLONAL ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96).

In addition, human antibodies can also be produced using additional techniques,
including phage display libraries (Hoogenboom and Winter, J. Mol. Biol., 227:381 (1991);
Marks et al., J. Mol. Biol., 222:581 (1991)). Similarly, human antibodies can be made by
introducing human immunoglobulin loci into transgenic animals, *e.g.*, mice in which the

endogenous immunoglobulin genes have been partially or completely inactivated. Upon challenge, human antibody production is observed, which closely resembles that seen in humans in all respects, including gene rearrangement, assembly, and antibody repertoire. This approach is described, for example, in U.S. Patent Nos. 5,545,807; 5,545,806; 5,569,825; 5,625,126; 5,633,425; 5,661,016, and in Marks et al. (Bio/Technology 10, 779-783 (1992)); Lonberg et al. (Nature 368 856-859 (1994)); Morrison (Nature 368, 812-13 (1994)); Fishwild et al,(Nature Biotechnology 14, 845-51 (1996)); Neuberger (Nature Biotechnology 14, 826 (1996)); and Lonberg and Huszar (Intern. Rev. Immunol. 13 65-93 (1995)).

Human antibodies may additionally be produced using transgenic nonhuman animals which are modified so as to produce fully human antibodies rather than the animal's endogenous antibodies in response to challenge by an antigen. (See PCT publication WO94/02602). The endogenous genes encoding the heavy and light immunoglobulin chains in the nonhuman host have been incapacitated, and active loci encoding human heavy and light chain immunoglobulins are inserted into the host's genome. The human genes are incorporated, for example, using yeast artificial chromosomes containing the requisite human DNA segments. An animal which provides all the desired modifications is then obtained as progeny by crossbreeding intermediate transgenic animals containing fewer than the full complement of the modifications. The preferred embodiment of such a nonhuman animal is a mouse, and is termed the Xenomouse™ as disclosed in PCT publications WO 96/33735 and WO 96/34096. This animal produces B cells which secrete fully human immunoglobulins. The antibodies can be obtained directly from the animal after immunization with an immunogen of interest, as, for example, a preparation of a polyclonal antibody, or alternatively from immortalized B cells derived from the animal, such as hybridomas producing monoclonal antibodies. Additionally, the genes encoding the immunoglobulins with human variable regions can be recovered and expressed to obtain the antibodies directly, or can be further modified to obtain analogs of antibodies such as, for example, single chain Fv molecules.

An example of a method of producing a nonhuman host, exemplified as a mouse, lacking expression of an endogenous immunoglobulin heavy chain is disclosed in U.S. Patent No. 5,939,598. It can be obtained by a method including deleting the J segment genes from at least one endogenous heavy chain locus in an embryonic stem cell to prevent rearrangement of the

locus and to prevent formation of a transcript of a rearranged immunoglobulin heavy chain locus, the deletion being effected by a targeting vector containing a gene encoding a selectable marker; and producing from the embryonic stem cell a transgenic mouse whose somatic and germ cells contain the gene encoding the selectable marker.

5 A method for producing an antibody of interest, such as a human antibody, is disclosed in U.S. Patent No. 5,916,771. It includes introducing an expression vector that contains a nucleotide sequence encoding a heavy chain into one mammalian host cell in culture, introducing an expression vector containing a nucleotide sequence encoding a light chain into another mammalian host cell, and fusing the two cells to form a hybrid cell. The hybrid cell expresses an
10 antibody containing the heavy chain and the light chain.

In a further improvement on this procedure, a method for identifying a clinically relevant epitope on an immunogen, and a correlative method for selecting an antibody that binds immunospecifically to the relevant epitope with high affinity, are disclosed in PCT publication WO 99/53049.

15 **F_{ab} Fragments and Single Chain Antibodies**

According to the invention, techniques can be adapted for the production of single-chain antibodies specific to an antigenic protein of the invention (see *e.g.*, U.S. Patent No. 4,946,778). In addition, methods can be adapted for the construction of F_{ab} expression libraries (see *e.g.*,
20 Huse, et al., 1989 Science 246: 1275-1281) to allow rapid and effective identification of monoclonal F_{ab} fragments with the desired specificity for a protein or derivatives, fragments, analogs or homologs thereof. Antibody fragments that contain the idiotypes to a protein antigen may be produced by techniques known in the art including, but not limited to: (i) an F_{(ab')₂} fragment produced by pepsin digestion of an antibody molecule; (ii) an F_{ab} fragment generated
25 by reducing the disulfide bridges of an F_{(ab')₂} fragment; (iii) an F_{ab} fragment generated by the treatment of the antibody molecule with papain and a reducing agent and (iv) F_v fragments.

Bispecific Antibodies

Bispecific antibodies are monoclonal, preferably human or humanized, antibodies that
30 have binding specificities for at least two different antigens. In the present case, one of the

binding specificities is for an antigenic protein of the invention. The second binding target is any other antigen, and advantageously is a cell-surface protein or receptor or receptor subunit.

Methods for making bispecific antibodies are known in the art. Traditionally, the recombinant production of bispecific antibodies is based on the co-expression of two immunoglobulin heavy-chain/light-chain pairs, where the two heavy chains have different specificities (Milstein and Cuello, Nature, 305:537-539 (1983)). Because of the random assortment of immunoglobulin heavy and light chains, these hybridomas (quadromas) produce a potential mixture of ten different antibody molecules, of which only one has the correct bispecific structure. The purification of the correct molecule is usually accomplished by affinity chromatography steps. Similar procedures are disclosed in WO 93/08829, published 13 May 1993, and in Traunecker *et al.*, 1991 *EMBO J.*, 10:3655-3659.

Antibody variable domains with the desired binding specificities (antibody-antigen combining sites) can be fused to immunoglobulin constant domain sequences. The fusion preferably is with an immunoglobulin heavy-chain constant domain, comprising at least part of the hinge, CH2, and CH3 regions. It is preferred to have the first heavy-chain constant region (CH1) containing the site necessary for light-chain binding present in at least one of the fusions. DNAs encoding the immunoglobulin heavy-chain fusions and, if desired, the immunoglobulin light chain, are inserted into separate expression vectors, and are co-transfected into a suitable host organism. For further details of generating bispecific antibodies see, for example, Suresh *et al.*, Methods in Enzymology, 121:210 (1986).

According to another approach described in WO 96/27011, the interface between a pair of antibody molecules can be engineered to maximize the percentage of heterodimers which are recovered from recombinant cell culture. The preferred interface comprises at least a part of the CH3 region of an antibody constant domain. In this method, one or more small amino acid side chains from the interface of the first antibody molecule are replaced with larger side chains (*e.g.* tyrosine or tryptophan). Compensatory "cavities" of identical or similar size to the large side chain(s) are created on the interface of the second antibody molecule by replacing large amino acid side chains with smaller ones (*e.g.* alanine or threonine). This provides a mechanism for increasing the yield of the heterodimer over other unwanted end-products such as homodimers.

Bispecific antibodies can be prepared as full length antibodies or antibody fragments (*e.g.* $F(ab')_2$ bispecific antibodies). Techniques for generating bispecific antibodies from antibody fragments have been described in the literature. For example, bispecific antibodies can be prepared using chemical linkage. Brennan et al., Science 229:81 (1985) describe a procedure wherein intact antibodies are proteolytically cleaved to generate $F(ab')_2$ fragments. These fragments are reduced in the presence of the dithiol complexing agent sodium arsenite to stabilize vicinal dithiols and prevent intermolecular disulfide formation. The Fab' fragments generated are then converted to thionitrobenzoate (TNB) derivatives. One of the Fab'-TNB derivatives is then reconverted to the Fab'-thiol by reduction with mercaptoethylamine and is mixed with an equimolar amount of the other Fab'-TNB derivative to form the bispecific antibody. The bispecific antibodies produced can be used as agents for the selective immobilization of enzymes.

Additionally, Fab' fragments can be directly recovered from *E. coli* and chemically coupled to form bispecific antibodies. Shalaby et al., J. Exp. Med. 175:217-225 (1992) describe the production of a fully humanized bispecific antibody $F(ab')_2$ molecule. Each Fab' fragment was separately secreted from *E. coli* and subjected to directed chemical coupling *in vitro* to form the bispecific antibody. The bispecific antibody thus formed was able to bind to cells overexpressing the ErbB2 receptor and normal human T cells, as well as trigger the lytic activity of human cytotoxic lymphocytes against human breast tumor targets.

Various techniques for making and isolating bispecific antibody fragments directly from recombinant cell culture have also been described. For example, bispecific antibodies have been produced using leucine zippers. Kostelny et al., J. Immunol. 148(5):1547-1553 (1992). The leucine zipper peptides from the Fos and Jun proteins were linked to the Fab' portions of two different antibodies by gene fusion. The antibody homodimers were reduced at the hinge region to form monomers and then re-oxidized to form the antibody heterodimers. This method can also be utilized for the production of antibody homodimers. The "diabody" technology described by Hollinger et al., Proc. Natl. Acad. Sci. USA 90:6444-6448 (1993) has provided an alternative mechanism for making bispecific antibody fragments. The fragments comprise a heavy-chain variable domain (V_H) connected to a light-chain variable domain (V_L) by a linker which is too short to allow pairing between the two domains on the same chain. Accordingly, the V_H and V_L

domains of one fragment are forced to pair with the complementary V_L and V_H domains of another fragment, thereby forming two antigen-binding sites. Another strategy for making bispecific antibody fragments by the use of single-chain Fv (sFv) dimers has also been reported. See, Gruber et al., J. Immunol. 152:5368 (1994).

5 Antibodies with more than two valencies are contemplated. For example, trispecific antibodies can be prepared. Tutt et al., J. Immunol. 147:60 (1991).

Exemplary bispecific antibodies can bind to two different epitopes, at least one of which originates in the protein antigen of the invention. Alternatively, an anti-antigenic arm of an immunoglobulin molecule can be combined with an arm which binds to a triggering molecule on
10 a leukocyte such as a T-cell receptor molecule (*e.g.* CD2, CD3, CD28, or B7), or Fc receptors for IgG (Fc R), such as Fc RI (CD64), Fc RII (CD32) and Fc RIII (CD16) so as to focus cellular defense mechanisms to the cell expressing the particular antigen. Bispecific antibodies can also be used to direct cytotoxic agents to cells which express a particular antigen. These antibodies possess an antigen-binding arm and an arm which binds a cytotoxic agent or a radionuclide
15 chelator, such as EOTUBE, DPTA, DOTA, or TETA. Another bispecific antibody of interest binds the protein antigen described herein and further binds tissue factor (TF).

Heteroconjugate Antibodies

Heteroconjugate antibodies are also within the scope of the present invention.
20 Heteroconjugate antibodies are composed of two covalently joined antibodies. Such antibodies have, for example, been proposed to target immune system cells to unwanted cells (U.S. Patent No. 4,676,980), and for treatment of HIV infection (WO 91/00360; WO 92/200373; EP 03089). It is contemplated that the antibodies can be prepared *in vitro* using known methods in synthetic protein chemistry, including those involving crosslinking agents. For example, immunotoxins
25 can be constructed using a disulfide exchange reaction or by forming a thioether bond. Examples of suitable reagents for this purpose include iminothiolate and methyl-4-mercaptobutyrimidate and those disclosed, for example, in U.S. Patent No. 4,676,980.

Effector Function Engineering

It can be desirable to modify the antibody of the invention with respect to effector function, so as to enhance, *e.g.*, the effectiveness of the antibody in treating cancer. For example, cysteine residue(s) can be introduced into the Fc region, thereby allowing interchain disulfide bond formation in this region. The homodimeric antibody thus generated can have improved internalization capability and/or increased complement-mediated cell killing and antibody-dependent cellular cytotoxicity (ADCC). See Caron et al., J. Exp Med., 176: 1191-1195 (1992) and Shopes, J. Immunol., 148: 2918-2922 (1992). Homodimeric antibodies with enhanced anti-tumor activity can also be prepared using heterobifunctional cross-linkers as described in Wolff et al. Cancer Research, 53: 2560-2565 (1993). Alternatively, an antibody can be engineered that has dual Fc regions and can thereby have enhanced complement lysis and ADCC capabilities. See Stevenson et al., Anti-Cancer Drug Design, 3: 219-230 (1989).

Immunoconjugates

The invention also pertains to immunoconjugates comprising an antibody conjugated to a cytotoxic agent such as a chemotherapeutic agent, toxin (*e.g.*, an enzymatically active toxin of bacterial, fungal, plant, or animal origin, or fragments thereof), or a radioactive isotope (*i.e.*, a radioconjugate).

Chemotherapeutic agents useful in the generation of such immunoconjugates have been described above. Enzymatically active toxins and fragments thereof that can be used include diphtheria A chain, nonbinding active fragments of diphtheria toxin, exotoxin A chain (from *Pseudomonas aeruginosa*), ricin A chain, abrin A chain, modeccin A chain, alpha-sarcin, Aleurites fordii proteins, dianthin proteins, Phytolaca americana proteins (PAPI, PAPII, and PAP-S), momordica charantia inhibitor, curcin, crotin, sapaonaria officinalis inhibitor, gelonin, mitogellin, restrictocin, phenomycin, enomycin, and the tricothecenes. A variety of radionuclides are available for the production of radioconjugated antibodies. Examples include ^{212}Bi , ^{131}I , ^{131}In , ^{90}Y , and ^{186}Re .

Conjugates of the antibody and cytotoxic agent are made using a variety of bifunctional protein-coupling agents such as N-succinimidyl-3-(2-pyridyldithiol) propionate (SPDP), iminothiolane (IT), bifunctional derivatives of imidoesters (such as dimethyl adipimidate HCL),

active esters (such as disuccinimidyl suberate), aldehydes (such as glutarelddehyde), bis-azido compounds (such as bis (p-azidobenzoyl) hexanediamine), bis-diazonium derivatives (such as bis-(p-diazoniumbenzoyl)-ethylenediamine), diisocyanates (such as tolyene 2,6-diisocyanate), and bis-active fluorine compounds (such as 1,5-difluoro-2,4-dinitrobenzene). For example, a ricin immunotoxin can be prepared as described in Vitetta et al., Science, 238: 1098 (1987). Carbon-14-labeled 1-isothiocyanatobenzyl-3-methyldiethylene triaminepentaacetic acid (MX-DTPA) is an exemplary chelating agent for conjugation of radionucleotide to the antibody. See WO94/11026.

In another embodiment, the antibody can be conjugated to a "receptor" (such streptavidin) for utilization in tumor pretargeting wherein the antibody-receptor conjugate is administered to the patient, followed by removal of unbound conjugate from the circulation using a clearing agent and then administration of a "ligand" (e.g., avidin) that is in turn conjugated to a cytotoxic agent.

ORX Recombinant Expression Vectors and Host Cells

Another aspect of the invention pertains to vectors, preferably expression vectors, containing a nucleic acid encoding an ORX protein, or derivatives, fragments, analogs or homologs thereof. As used herein, the term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of vector is a "plasmid", which refers to a circular double stranded DNA loop into which additional DNA segments can be ligated. Another type of vector is a viral vector, wherein additional DNA segments can be ligated into the viral genome. Certain vectors are capable of autonomous replication in a host cell into which they are introduced (e.g., bacterial vectors having a bacterial origin of replication and episomal mammalian vectors). Other vectors (e.g., non-episomal mammalian vectors) are integrated into the genome of a host cell upon introduction into the host cell, and thereby are replicated along with the host genome. Moreover, certain vectors are capable of directing the expression of genes to which they are operatively-linked. Such vectors are referred to herein as "expression vectors". In general, expression vectors of utility in recombinant DNA techniques are often in the form of plasmids. In the present specification, "plasmid" and "vector" can be used interchangeably as the plasmid is the most commonly used form of vector. However, the

invention is intended to include such other forms of expression vectors, such as viral vectors (e.g., replication defective retroviruses, adenoviruses and adeno-associated viruses), which serve equivalent functions.

The recombinant expression vectors of the invention comprise a nucleic acid of the invention in a form suitable for expression of the nucleic acid in a host cell, which means that the recombinant expression vectors include one or more regulatory sequences, selected on the basis of the host cells to be used for expression, that is operatively-linked to the nucleic acid sequence to be expressed. Within a recombinant expression vector, "operably-linked" is intended to mean that the nucleotide sequence of interest is linked to the regulatory sequence(s) in a manner that allows for expression of the nucleotide sequence (e.g., in an *in vitro* transcription/translation system or in a host cell when the vector is introduced into the host cell).

The term "regulatory sequence" is intended to include promoters, enhancers and other expression control elements (e.g., polyadenylation signals). Such regulatory sequences are described, for example, in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Regulatory sequences include those that direct constitutive expression of a nucleotide sequence in many types of host cell and those that direct expression of the nucleotide sequence only in certain host cells (e.g., tissue-specific regulatory sequences). It will be appreciated by those skilled in the art that the design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of protein desired, etc. The expression vectors of the invention can be introduced into host cells to thereby produce proteins or peptides, including fusion proteins or peptides, encoded by nucleic acids as described herein (e.g., ORX proteins, mutant forms of ORX proteins, fusion proteins, etc.).

The recombinant expression vectors of the invention can be designed for expression of ORX proteins in prokaryotic or eukaryotic cells. For example, ORX proteins can be expressed in bacterial cells such as *Escherichia coli*, insect cells (using baculovirus expression vectors) yeast cells or mammalian cells. Suitable host cells are discussed further in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

Expression of proteins in prokaryotes is most often carried out in *Escherichia coli* with vectors containing constitutive or inducible promoters directing the expression of either fusion or non-fusion proteins. Fusion vectors add a number of amino acids to a protein encoded therein, usually to the amino terminus of the recombinant protein. Such fusion vectors typically serve three purposes: (i) to increase expression of recombinant protein; (ii) to increase the solubility of the recombinant protein; and (iii) to aid in the purification of the recombinant protein by acting as a ligand in affinity purification. Often, in fusion expression vectors, a proteolytic cleavage site is introduced at the junction of the fusion moiety and the recombinant protein to enable separation of the recombinant protein from the fusion moiety subsequent to purification of the fusion protein. Such enzymes, and their cognate recognition sequences, include Factor Xa, thrombin and enterokinase. Typical fusion expression vectors include pGEX (Pharmacia Biotech Inc; Smith and Johnson, 1988. *Gene* 67: 31-40), pMAL (New England Biolabs, Beverly, Mass.) and pRIT5 (Pharmacia, Piscataway, N.J.) that fuse glutathione S-transferase (GST), maltose E binding protein, or protein A, respectively, to the target recombinant protein.

Examples of suitable inducible non-fusion *E. coli* expression vectors include pTrc (Amrann *et al.*, (1988) *Gene* 69:301-315) and pET 11d (Studier *et al.*, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 60-89).

One strategy to maximize recombinant protein expression in *E. coli* is to express the protein in a host bacteria with an impaired capacity to proteolytically cleave the recombinant protein. See, e.g., Gottesman, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 119-128. Another strategy is to alter the nucleic acid sequence of the nucleic acid to be inserted into an expression vector so that the individual codons for each amino acid are those preferentially utilized in *E. coli* (see, e.g., Wada, *et al.*, 1992. *Nucl. Acids Res.* 20: 2111-2118). Such alteration of nucleic acid sequences of the invention can be carried out by standard DNA synthesis techniques.

In another embodiment, the ORX expression vector is a yeast expression vector. Examples of vectors for expression in yeast *Saccharomyces cerevisiae* include pYepSec1 (Baldari, *et al.*, 1987. *EMBO J.* 6: 229-234), pMFa (Kurjan and Herskowitz, 1982. *Cell* 30:

933-943), pJRY88 (Schultz *et al.*, 1987. *Gene* 54: 113-123), pYES2 (Invitrogen Corporation, San Diego, Calif.), and picZ (InVitrogen Corp, San Diego, Calif.).

Alternatively, ORX can be expressed in insect cells using baculovirus expression vectors. Baculovirus vectors available for expression of proteins in cultured insect cells (*e.g.*, SF9 cells) include the pAc series (Smith, *et al.*, 1983. *Mol. Cell. Biol.* 3: 2156-2165) and the pVL series (Lucklow and Summers, 1989. *Virology* 170: 31-39).

In yet another embodiment, a nucleic acid of the invention is expressed in mammalian cells using a mammalian expression vector. Examples of mammalian expression vectors include pCDM8 (Seed, 1987. *Nature* 329: 840) and pMT2PC (Kaufman, *et al.*, 1987. *EMBO J.* 6: 187-195). When used in mammalian cells, the expression vector's control functions are often provided by viral regulatory elements. For example, commonly used promoters are derived from polyoma, adenovirus 2, cytomegalovirus, and simian virus 40. For other suitable expression systems for both prokaryotic and eukaryotic cells see, *e.g.*, Chapters 16 and 17 of Sambrook, *et al.*, MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989.

In another embodiment, the recombinant mammalian expression vector is capable of directing expression of the nucleic acid preferentially in a particular cell type (*e.g.*, tissue-specific regulatory elements are used to express the nucleic acid). Tissue-specific regulatory elements are known in the art. Non-limiting examples of suitable tissue-specific promoters include the albumin promoter (liver-specific; Pinkert, *et al.*, 1987. *Genes Dev.* 1: 268-277), lymphoid-specific promoters (Calame and Eaton, 1988. *Adv. Immunol.* 43: 235-275), in particular promoters of T cell receptors (Winoto and Baltimore, 1989. *EMBO J.* 8: 729-733) and immunoglobulins (Banerji, *et al.*, 1983. *Cell* 33: 729-740; Queen and Baltimore, 1983. *Cell* 33: 741-748), neuron-specific promoters (*e.g.*, the neurofilament promoter; Byrne and Ruddle, 1989. *Proc. Natl. Acad. Sci. USA* 86: 5473-5477), pancreas-specific promoters (Edlund, *et al.*, 1985. *Science* 230: 912-916), and mammary gland-specific promoters (*e.g.*, milk whey promoter; U.S. Pat. No. 4,873,316 and European Application Publication No. 264,166). Developmentally-regulated promoters are also encompassed, *e.g.*, the murine hox promoters (Kessel and Gruss, 1990. *Science* 249: 374-379) and the α -fetoprotein promoter (Campes and Tilghman, 1989. *Genes Dev.* 3: 537-546).

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The invention further provides a recombinant expression vector comprising a DNA molecule of the invention cloned into the expression vector in an antisense orientation. That is, the DNA molecule is operatively-linked to a regulatory sequence in a manner that allows for expression (by transcription of the DNA molecule) of an RNA molecule that is antisense to ORX mRNA. Regulatory sequences operatively linked to a nucleic acid cloned in the antisense orientation can be chosen that direct the continuous expression of the antisense RNA molecule in a variety of cell types, for instance viral promoters and/or enhancers, or regulatory sequences can be chosen that direct constitutive, tissue specific or cell type specific expression of antisense RNA. The antisense expression vector can be in the form of a recombinant plasmid, phagemid or attenuated virus in which antisense nucleic acids are produced under the control of a high efficiency regulatory region, the activity of which can be determined by the cell type into which the vector is introduced. For a discussion of the regulation of gene expression using antisense genes *see, e.g.*, Weintraub, *et al.*, "Antisense RNA as a molecular tool for genetic analysis," *Reviews-Trends in Genetics*, Vol. 1(1) 1986.

Another aspect of the invention pertains to host cells into which a recombinant expression vector of the invention has been introduced. The terms "host cell" and "recombinant host cell" are used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein.

A host cell can be any prokaryotic or eukaryotic cell. For example, ORX protein can be expressed in bacterial cells such as *E. coli*, insect cells, yeast or mammalian cells (such as human, Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

Vector DNA can be introduced into prokaryotic or eukaryotic cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of art-recognized techniques for introducing foreign nucleic acid (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, DEAE-dextran-mediated transfection, lipofection, or electroporation.

Suitable methods for transforming or transfecting host cells can be found in Sambrook, *et al.* (MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989), and other laboratory manuals.

For stable transfection of mammalian cells, it is known that, depending upon the expression vector and transfection technique used, only a small fraction of cells may integrate the foreign DNA into their genome. In order to identify and select these integrants, a gene that encodes a selectable marker (*e.g.*, resistance to antibiotics) is generally introduced into the host cells along with the gene of interest. Various selectable markers include those that confer resistance to drugs, such as G418, hygromycin and methotrexate. Nucleic acid encoding a selectable marker can be introduced into a host cell on the same vector as that encoding ORX or can be introduced on a separate vector. Cells stably transfected with the introduced nucleic acid can be identified by drug selection (*e.g.*, cells that have incorporated the selectable marker gene will survive, while the other cells die).

A host cell of the invention, such as a prokaryotic or eukaryotic host cell in culture, can be used to produce (*i.e.*, express) ORX protein. Accordingly, the invention further provides methods for producing ORX protein using the host cells of the invention. In one embodiment, the method comprises culturing the host cell of invention (into which a recombinant expression vector encoding ORX protein has been introduced) in a suitable medium such that ORX protein is produced. In another embodiment, the method further comprises isolating ORX protein from the medium or the host cell.

Transgenic ORX Animals

The host cells of the invention can also be used to produce non-human transgenic animals. For example, in one embodiment, a host cell of the invention is a fertilized oocyte or an embryonic stem cell into which ORX protein-coding sequences have been introduced. Such host cells can then be used to create non-human transgenic animals in which exogenous ORX sequences have been introduced into their genome or homologous recombinant animals in which endogenous ORX sequences have been altered. Such animals are useful for studying the function and/or activity of ORX protein and for identifying and/or evaluating modulators of

ORX protein activity. As used herein, a "transgenic animal" is a non-human animal, preferably a mammal, more preferably a rodent such as a rat or mouse, in which one or more of the cells of the animal includes a transgene. Other examples of transgenic animals include non-human primates, sheep, dogs, cows, goats, chickens, amphibians, etc. A transgene is exogenous DNA that is integrated into the genome of a cell from which a transgenic animal develops and that remains in the genome of the mature animal, thereby directing the expression of an encoded gene product in one or more cell types or tissues of the transgenic animal. As used herein, a "homologous recombinant animal" is a non-human animal, preferably a mammal, more preferably a mouse, in which an endogenous ORX gene has been altered by homologous recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal, *e.g.*, an embryonic cell of the animal, prior to development of the animal.

A transgenic animal of the invention can be created by introducing ORX-encoding nucleic acid into the male pronuclei of a fertilized oocyte (*e.g.*, by microinjection, retroviral infection) and allowing the oocyte to develop in a pseudopregnant female foster animal. Sequences including GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 can be introduced as a transgene into the genome of a non-human animal. Alternatively, a non-human homologue of the human ORX gene, such as a mouse ORX gene, can be isolated based on hybridization to the human ORX cDNA (described further *supra*) and used as a transgene. Intronic sequences and polyadenylation signals can also be included in the transgene to increase the efficiency of expression of the transgene. A tissue-specific regulatory sequence(s) can be operably-linked to the ORX transgene to direct expression of ORX protein to particular cells. Methods for generating transgenic animals via embryo manipulation and microinjection, particularly animals such as mice, have become conventional in the art and are described, for example, in U.S. Patent Nos. 4,736,866; 4,870,009; and 4,873,191; and Hogan, 1986. In: MANIPULATING THE MOUSE EMBRYO, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y. Similar methods are used for production of other transgenic animals. A transgenic founder animal can be identified based upon the presence of the ORX transgene in its genome and/or expression of ORX mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the

transgene. Moreover, transgenic animals carrying a transgene-encoding ORX protein can further be bred to other transgenic animals carrying other transgenes.

To create a homologous recombinant animal, a vector is prepared which contains at least a portion of an ORX gene into which a deletion, addition or substitution has been introduced to thereby alter, *e.g.*, functionally disrupt, the ORX gene. The ORX gene can be a human gene, but more preferably, is a non-human homologue of a human ORX gene. For example, a mouse homologue of human ORX gene of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, can be used to construct a homologous recombination vector suitable for altering an endogenous ORX gene in the mouse genome. In one embodiment, the vector is designed such that, upon homologous recombination, the endogenous ORX gene is functionally disrupted (*i.e.*, no longer encodes a functional protein; also referred to as a "knock out" vector).

Alternatively, the vector can be designed such that, upon homologous recombination, the endogenous ORX gene is mutated or otherwise altered but still encodes functional protein (*e.g.*, the upstream regulatory region can be altered to thereby alter the expression of the endogenous ORX protein). In the homologous recombination vector, the altered portion of the ORX gene is flanked at its 5'- and 3'-termini by additional nucleic acid of the ORX gene to allow for homologous recombination to occur between the exogenous ORX gene carried by the vector and an endogenous ORX gene in an embryonic stem cell. The additional flanking ORX nucleic acid is of sufficient length for successful homologous recombination with the endogenous gene. Typically, several kilobases of flanking DNA (both at the 5'- and 3'-termini) are included in the vector. *See, e.g.*, Thomas, *et al.*, 1987. *Cell* 51: 503 for a description of homologous recombination vectors. The vector is then introduced into an embryonic stem cell line (*e.g.*, by electroporation) and cells in which the introduced ORX gene has homologously-recombined with the endogenous ORX gene are selected. *See, e.g.*, Li, *et al.*, 1992. *Cell* 69: 915.

The selected cells are then injected into a blastocyst of an animal (*e.g.*, a mouse) to form aggregation chimeras. *See, e.g.*, Bradley, 1987. In: TERATOCARCINOMAS AND EMBRYONIC STEM CELLS: A PRACTICAL APPROACH, Robertson, ed. IRL, Oxford, pp. 113-152. A chimeric embryo can then be implanted into a suitable pseudopregnant female foster animal and the embryo brought to term. Progeny harboring the homologously-recombined DNA in their germ cells can

be used to breed animals in which all cells of the animal contain the homologously-recombined DNA by germline transmission of the transgene. Methods for constructing homologous recombination vectors and homologous recombinant animals are described further in Bradley, 1991. *Curr. Opin. Biotechnol.* 2: 823-829; PCT International Publication Nos.: WO 90/11354; WO 91/01140; WO 92/0968; and WO 93/04169.

In another embodiment, transgenic non-humans animals can be produced that contain selected systems that allow for regulated expression of the transgene. One example of such a system is the cre/loxP recombinase system of bacteriophage P1. For a description of the cre/loxP recombinase system, See, e.g., Lakso, *et al.*, 1992. *Proc. Natl. Acad. Sci. USA* 89: 6232-6236. Another example of a recombinase system is the FLP recombinase system of *Saccharomyces cerevisiae*. See, O'Gorman, *et al.*, 1991. *Science* 251:1351-1355. If a cre/loxP recombinase system is used to regulate expression of the transgene, animals containing transgenes encoding both the Cre recombinase and a selected protein are required. Such animals can be provided through the construction of "double" transgenic animals, e.g., by mating two transgenic animals, one containing a transgene encoding a selected protein and the other containing a transgene encoding a recombinase.

Clones of the non-human transgenic animals described herein can also be produced according to the methods described in Wilmut, *et al.*, 1997. *Nature* 385: 810-813. In brief, a cell (e.g., a somatic cell) from the transgenic animal can be isolated and induced to exit the growth cycle and enter G₀ phase. The quiescent cell can then be fused, e.g., through the use of electrical pulses, to an enucleated oocyte from an animal of the same species from which the quiescent cell is isolated. The reconstructed oocyte is then cultured such that it develops to morula or blastocyte and then transferred to pseudopregnant female foster animal. The offspring borne of this female foster animal will be a clone of the animal from which the cell (e.g., the somatic cell) is isolated.

Pharmaceutical Compositions

The ORX nucleic acid molecules, ORX proteins, and anti-ORX antibodies (also referred to herein as "active compounds") of the invention, and derivatives, fragments, analogs and homologs thereof, can be incorporated into pharmaceutical compositions suitable for

administration. Such compositions typically comprise the nucleic acid molecule, protein, or antibody and a pharmaceutically acceptable carrier. As used herein, "pharmaceutically acceptable carrier" is intended to include any and all solvents, dispersion media, coatings, antibacterial and antifungal agents, isotonic and absorption delaying agents, and the like, compatible with pharmaceutical administration. Suitable carriers are described in the most recent edition of Remington's Pharmaceutical Sciences, a standard reference text in the field, which is incorporated herein by reference. Preferred examples of such carriers or diluents include, but are not limited to, water, saline, finger's solutions, dextrose solution, and 5% human serum albumin. Liposomes and non-aqueous vehicles such as fixed oils may also be used. The use of such media and agents for pharmaceutically active substances is well known in the art. Except insofar as any conventional media or agent is incompatible with the active compound, use thereof in the compositions is contemplated. Supplementary active compounds can also be incorporated into the compositions.

The antibodies disclosed herein can also be formulated as immunoliposomes.

Liposomes containing the antibody are prepared by methods known in the art, such as described in Epstein et al., Proc. Natl. Acad. Sci. USA, 82: 3688 (1985); Hwang et al., Proc. Natl. Acad. Sci. USA, 77: 4030 (1980); and U.S. Pat. Nos. 4,485,045 and 4,544,545. Liposomes with enhanced circulation time are disclosed in U.S. Patent No. 5,013,556.

Particularly useful liposomes can be generated by the reverse-phase evaporation method with a lipid composition comprising phosphatidylcholine, cholesterol, and PEG-derivatized phosphatidylethanolamine (PEG-PE). Liposomes are extruded through filters of defined pore size to yield liposomes with the desired diameter. Fab' fragments of the antibody of the present invention can be conjugated to the liposomes as described in Martin et al., J. Biol. Chem., 257: 286-288 (1982) via a disulfide-interchange reaction. A chemotherapeutic agent (such as Doxorubicin) is optionally contained within the liposome. See Gabizon et al., J. National Cancer Inst., 81(19): 1484 (1989).

A pharmaceutical composition of the invention is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral, *e.g.*, intravenous, intradermal, subcutaneous, oral (*e.g.*, inhalation), transdermal (*i.e.*, topical), transmucosal, and rectal administration. Solutions or suspensions used for parenteral,

intradermal, or subcutaneous application can include the following components: a sterile diluent such as water for injection, saline solution, fixed oils, polyethylene glycols, glycerine, propylene glycol or other synthetic solvents; antibacterial agents such as benzyl alcohol or methyl parabens; antioxidants such as ascorbic acid or sodium bisulfite; chelating agents such as ethylenediaminetetraacetic acid (EDTA); buffers such as acetates, citrates or phosphates, and agents for the adjustment of tonicity such as sodium chloride or dextrose. The pH can be adjusted with acids or bases, such as hydrochloric acid or sodium hydroxide. The parenteral preparation can be enclosed in ampoules, disposable syringes or multiple dose vials made of glass or plastic.

Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, N.J.) or phosphate buffered saline (PBS). In all cases, the composition must be sterile and should be fluid to the extent that easy syringeability exists. It must be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. The proper fluidity can be maintained, for example, by the use of a coating such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Prevention of the action of microorganisms can be achieved by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, ascorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as manitol, sorbitol, sodium chloride in the composition. Prolonged absorption of the injectable compositions can be brought about by including in the composition an agent which delays absorption, for example, aluminum monostearate and gelatin.

Sterile injectable solutions can be prepared by incorporating the active compound (e.g., an ORX protein or anti-ORX antibody) in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization.

Generally, dispersions are prepared by incorporating the active compound into a sterile vehicle that contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, methods of preparation are vacuum drying and freeze-drying that yields a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

Oral compositions generally include an inert diluent or an edible carrier. They can be enclosed in gelatin capsules or compressed into tablets. For the purpose of oral therapeutic administration, the active compound can be incorporated with excipients and used in the form of tablets, troches, or capsules. Oral compositions can also be prepared using a fluid carrier for use as a mouthwash, wherein the compound in the fluid carrier is applied orally and swished and expectorated or swallowed. Pharmaceutically compatible binding agents, and/or adjuvant materials can be included as part of the composition. The tablets, pills, capsules, troches and the like can contain any of the following ingredients, or compounds of a similar nature: a binder such as microcrystalline cellulose, gum tragacanth or gelatin; an excipient such as starch or lactose, a disintegrating agent such as alginic acid, Primogel, or corn starch; a lubricant such as magnesium stearate or Sterotes; a glidant such as colloidal silicon dioxide; a sweetening agent such as sucrose or saccharin; or a flavoring agent such as peppermint, methyl salicylate, or orange flavoring.

For administration by inhalation, the compounds are delivered in the form of an aerosol spray from pressured container or dispenser which contains a suitable propellant, *e.g.*, a gas such as carbon dioxide, or a nebulizer.

Systemic administration can also be by transmucosal or transdermal means. For transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, for transmucosal administration, detergents, bile salts, and fusidic acid derivatives. Transmucosal administration can be accomplished through the use of nasal sprays or suppositories. For transdermal administration, the active compounds are formulated into ointments, salves, gels, or creams as generally known in the art.

The compounds can also be prepared in the form of suppositories (*e.g.*, with conventional suppository bases such as cocoa butter and other glycerides) or retention enemas for rectal delivery.

In one embodiment, the active compounds are prepared with carriers that will protect the compound against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable, biocompatible polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, and polylactic acid. Methods for preparation of such formulations will be apparent to those skilled in the art. The materials can also be obtained commercially from Alza Corporation and Nova Pharmaceuticals, Inc. Liposomal suspensions (including liposomes targeted to infected cells with monoclonal antibodies to viral antigens) can also be used as pharmaceutically acceptable carriers. These can be prepared according to methods known to those skilled in the art, for example, as described in U.S. Patent No. 4,522,811.

It is especially advantageous to formulate oral or parenteral compositions in dosage unit form for ease of administration and uniformity of dosage. Dosage unit form as used herein refers to physically discrete units suited as unitary dosages for the subject to be treated; each unit containing a predetermined quantity of active compound calculated to produce the desired therapeutic effect in association with the required pharmaceutical carrier. The specification for the dosage unit forms of the invention are dictated by and directly dependent on the unique characteristics of the active compound and the particular therapeutic effect to be achieved, and the limitations inherent in the art of compounding such an active compound for the treatment of individuals.

The nucleic acid molecules of the invention can be inserted into vectors and used as gene therapy vectors. Gene therapy vectors can be delivered to a subject by, for example, intravenous injection, local administration (*see, e.g.*, U.S. Patent No. 5,328,470) or by stereotactic injection (*see, e.g.*, Chen, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 3054-3057). The pharmaceutical preparation of the gene therapy vector can include the gene therapy vector in an acceptable diluent, or can comprise a slow release matrix in which the gene delivery vehicle is imbedded. Alternatively, where the complete gene delivery vector can be produced intact from recombinant

cells, *e.g.*, retroviral vectors, the pharmaceutical preparation can include one or more cells that produce the gene delivery system.

Antibodies specifically binding a protein of the invention, as well as other molecules identified by the screening assays disclosed herein, can be administered for the treatment of various disorders in the form of pharmaceutical compositions. Principles and considerations involved in preparing such compositions, as well as guidance in the choice of components are provided, for example, in Remington : The Science And Practice Of Pharmacy 19th ed. (Alfonso R. Gennaro, et al., editors) Mack Pub. Co., Easton, Pa.: 1995; Drug Absorption Enhancement : Concepts, Possibilities, Limitations, And Trends, Harwood Academic Publishers, Langhorne, Pa., 1994; and Peptide And Protein Drug Delivery (Advances In Parenteral Sciences, Vol. 4), 1991, M. Dekker, New York. If the antigenic protein is intracellular and whole antibodies are used as inhibitors, internalizing antibodies are preferred. However, liposomes can also be used to deliver the antibody, or an antibody fragment, into cells. Where antibody fragments are used, the smallest inhibitory fragment that specifically binds to the binding domain of the target protein is preferred. For example, based upon the variable-region sequences of an antibody, peptide molecules can be designed that retain the ability to bind the target protein sequence. Such peptides can be synthesized chemically and/or produced by recombinant DNA technology. See, *e.g.*, Marasco *et al.*, 1993 *Proc. Natl. Acad. Sci. USA*, 90: 7889-7893. The formulation herein can also contain more than one active compound as necessary for the particular indication being treated, preferably those with complementary activities that do not adversely affect each other. Alternatively, or in addition, the composition can comprise an agent that enhances its function, such as, for example, a cytotoxic agent, cytokine, chemotherapeutic agent, or growth-inhibitory agent. Such molecules are suitably present in combination in amounts that are effective for the purpose intended. The active ingredients can also be entrapped in microcapsules prepared, for example, by coacervation techniques or by interfacial polymerization, for example, hydroxymethylcellulose or gelatin-microcapsules and poly-(methylmethacrylate) microcapsules, respectively, in colloidal drug delivery systems (for example, liposomes, albumin microspheres, microemulsions, nano-particles, and nanocapsules) or in macroemulsions.

The formulations to be used for *in vivo* administration must be sterile. This is readily accomplished by filtration through sterile filtration membranes.

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Sustained-release preparations can be prepared. Suitable examples of sustained-release preparations include semipermeable matrices of solid hydrophobic polymers containing the antibody, which matrices are in the form of shaped articles, *e.g.*, films, or microcapsules. Examples of sustained-release matrices include polyesters, hydrogels (for example, poly(2-hydroxyethyl-methacrylate), or poly(vinylalcohol)), polylactides (U.S. Pat. No. 3,773,919), copolymers of L-glutamic acid and ethyl-L-glutamate, non-degradable ethylene-vinyl acetate, degradable lactic acid-glycolic acid copolymers such as the LUPRON DEPOT™ (injectable microspheres composed of lactic acid-glycolic acid copolymer and leuprolide acetate), and poly-D-(-)-3-hydroxybutyric acid. While polymers such as ethylene-vinyl acetate and lactic acid-glycolic acid enable release of molecules for over 100 days, certain hydrogels release proteins for shorter time periods.

The pharmaceutical compositions can be included in a container, pack, or dispenser together with instructions for administration.

Screening and Detection Methods

The isolated nucleic acid molecules of the invention can be used to express ORX protein (*e.g.*, via a recombinant expression vector in a host cell in gene therapy applications), to detect ORX mRNA (*e.g.*, in a biological sample) or a genetic lesion in an ORX gene, and to modulate ORX activity, as described further, below. In addition, the ORX proteins can be used to screen drugs or compounds that modulate the ORX protein activity or expression as well as to treat disorders characterized by insufficient or excessive production of ORX protein or production of ORX protein forms that have decreased or aberrant activity compared to ORX wild-type protein. In addition, the anti-ORX antibodies of the invention can be used to detect and isolate ORX proteins and modulate ORX activity. For example, ORX activity includes growth and differentiation, antibody production, and tumor growth.

The invention further pertains to novel agents identified by the screening assays described herein and uses thereof for treatments as described, *supra*.

Screening Assays

The invention provides a method (also referred to herein as a "screening assay") for identifying modulators, *i.e.*, candidate or test compounds or agents (*e.g.*, peptides,

peptidomimetics, small molecules or other drugs) that bind to ORX proteins or have a stimulatory or inhibitory effect on, *e.g.*, ORX protein expression or ORX protein activity. The invention also includes compounds identified in the screening assays described herein.

In one embodiment, the invention provides assays for screening candidate or test compounds which bind to or modulate the activity of the membrane-bound form of an ORX protein or polypeptide or biologically-active portion thereof. The test compounds of the invention can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; the "one-bead one-compound" library method; and synthetic library methods using affinity chromatography selection. The biological library approach is limited to peptide libraries, while the other four approaches are applicable to peptide, non-peptide oligomer or small molecule libraries of compounds. *See, e.g., Lam, 1997. Anticancer Drug Design 12: 145.*

A "small molecule" as used herein, is meant to refer to a composition that has a molecular weight of less than about 5 kD and most preferably less than about 4 kD. Small molecules can be, *e.g.*, nucleic acids, peptides, polypeptides, peptidomimetics, carbohydrates, lipids or other organic or inorganic molecules. Libraries of chemical and/or biological mixtures, such as fungal, bacterial, or algal extracts, are known in the art and can be screened with any of the assays of the invention.

Examples of methods for the synthesis of molecular libraries can be found in the art, for example in: DeWitt, *et al.*, 1993. *Proc. Natl. Acad. Sci. U.S.A.* 90: 6909; Erb, *et al.*, 1994. *Proc. Natl. Acad. Sci. U.S.A.* 91: 11422; Zuckermann, *et al.*, 1994. *J. Med. Chem.* 37: 2678; Cho, *et al.*, 1993. *Science* 261: 1303; Carrell, *et al.*, 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2059; Carell, *et al.*, 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2061; and Gallop, *et al.*, 1994. *J. Med. Chem.* 37: 1233.

Libraries of compounds may be presented in solution (*e.g.*, Houghten, 1992. *Biotechniques* 13: 412-421), or on beads (Lam, 1991. *Nature* 354: 82-84), on chips (Fodor, 1993. *Nature* 364: 555-556), bacteria (Ladner, U.S. Patent No. 5,223,409), spores (Ladner, U.S. Patent 5,233,409), plasmids (Cull, *et al.*, 1992. *Proc. Natl. Acad. Sci. USA* 89: 1865-1869) or on phage (Scott and Smith, 1990. *Science* 249: 386-390; Devlin, 1990. *Science* 249: 404-406; Cwirla, *et*

al., 1990. *Proc. Natl. Acad. Sci. U.S.A.* 87: 6378-6382; Felici, 1991. *J. Mol. Biol.* 222: 301-310; Ladner, U.S. Patent No. 5,233,409.).

In one embodiment, an assay is a cell-based assay in which a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface is contacted with a test compound and the ability of the test compound to bind to an ORX protein determined. The cell, for example, can be of mammalian origin or a yeast cell. Determining the ability of the test compound to bind to the ORX protein can be accomplished, for example, by coupling the test compound with a radioisotope or enzymatic label such that binding of the test compound to the ORX protein or biologically-active portion thereof can be determined by detecting the labeled compound in a complex. For example, test compounds can be labeled with ^{125}I , ^{35}S , ^{14}C , or ^3H , either directly or indirectly, and the radioisotope detected by direct counting of radioemission or by scintillation counting. Alternatively, test compounds can be enzymatically-labeled with, for example, horseradish peroxidase, alkaline phosphatase, or luciferase, and the enzymatic label detected by determination of conversion of an appropriate substrate to product. In one embodiment, the assay comprises contacting a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX protein or a biologically-active portion thereof as compared to the known compound.

In another embodiment, an assay is a cell-based assay comprising contacting a cell expressing a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a test compound and determining the ability of the test compound to modulate (*e.g.*, stimulate or inhibit) the activity of the ORX protein or biologically-active portion thereof. Determining the ability of the test compound to modulate the activity of ORX or a biologically-active portion thereof can be accomplished, for example, by determining the ability of the ORX protein to bind to or interact with an ORX target molecule. As used herein, a "target molecule" is a molecule with which an ORX protein binds or interacts in nature, for example, a molecule on the surface of a cell which expresses an ORX interacting protein, a molecule on the

surface of a second cell, a molecule in the extracellular milieu, a molecule associated with the internal surface of a cell membrane or a cytoplasmic molecule. An ORX target molecule can be a non-ORX molecule or an ORX protein or polypeptide of the invention. In one embodiment, an ORX target molecule is a component of a signal transduction pathway that facilitates transduction of an extracellular signal (*e.g.* a signal generated by binding of a compound to a membrane-bound ORX molecule) through the cell membrane and into the cell. The target, for example, can be a second intercellular protein that has catalytic activity or a protein that facilitates the association of downstream signaling molecules with ORX.

Determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by one of the methods described above for determining direct binding. In one embodiment, determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by determining the activity of the target molecule. For example, the activity of the target molecule can be determined by detecting induction of a cellular second messenger of the target (*i.e.* intracellular Ca^{2+} , diacylglycerol, IP_3 , etc.), detecting catalytic/enzymatic activity of the target on an appropriate substrate, detecting the induction of a reporter gene (comprising an ORX-responsive regulatory element operatively linked to a nucleic acid encoding a detectable marker, *e.g.*, luciferase), or detecting a cellular response, for example, cell survival, cellular differentiation, or cell proliferation.

In yet another embodiment, an assay of the invention is a cell-free assay comprising contacting an ORX protein or biologically-active portion thereof with a test compound and determining the ability of the test compound to bind to the ORX protein or biologically-active portion thereof. Binding of the test compound to the ORX protein can be determined either directly or indirectly as described above. In one such embodiment, the assay comprises contacting the ORX protein or biologically-active portion thereof with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX or biologically-active portion thereof as compared to the known compound.

1 In still another embodiment, an assay is a cell-free assay comprising contacting ORX
protein or biologically-active portion thereof with a test compound and determining the ability of
the test compound to modulate (*e.g.* stimulate or inhibit) the activity of the ORX protein or
biologically-active portion thereof. Determining the ability of the test compound to modulate the
5 activity of ORX can be accomplished, for example, by determining the ability of the ORX
protein to bind to an ORX target molecule by one of the methods described above for
determining direct binding. In an alternative embodiment, determining the ability of the test
compound to modulate the activity of ORX protein can be accomplished by determining the
ability of the ORX protein further modulate an ORX target molecule. For example, the
10 catalytic/enzymatic activity of the target molecule on an appropriate substrate can be determined
as described above.

11 In yet another embodiment, the cell-free assay comprises contacting the ORX protein or
biologically-active portion thereof with a known compound which binds ORX protein to form an
assay mixture, contacting the assay mixture with a test compound, and determining the ability of
15 the test compound to interact with an ORX protein, wherein determining the ability of the test
compound to interact with an ORX protein comprises determining the ability of the ORX protein
to preferentially bind to or modulate the activity of an ORX target molecule.

16 The cell-free assays of the invention are amenable to use of both the soluble form or the
membrane-bound form of ORX protein. In the case of cell-free assays comprising the
membrane-bound form of ORX protein, it may be desirable to utilize a solubilizing agent such
20 that the membrane-bound form of ORX protein is maintained in solution. Examples of such
solubilizing agents include non-ionic detergents such as n-octylglucoside, n-dodecylglucoside,
n-dodecylmaltoside, octanoyl-N-methylglucamide, decanoyl-N-methylglucamide, Triton[®]
X-100, Triton[®] X-114, Thesit[®], Isotridecypoly(ethylene glycol ether)_n, N-dodecyl--
25 N,N-dimethyl-3-ammonio-1-propane sulfonate, 3-(3-cholamidopropyl) dimethylamminiol-
1-propane sulfonate (CHAPS), or 3-(3-cholamidopropyl)dimethylamminiol-2-hydroxy-
1-propane sulfonate (CHAPSO).

26 In more than one embodiment of the above assay methods of the invention, it may be
desirable to immobilize either ORX protein or its target molecule to facilitate separation of
30 complexed from uncomplexed forms of one or both of the proteins, as well as to accommodate

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automation of the assay. Binding of a test compound to ORX protein, or interaction of ORX protein with a target molecule in the presence and absence of a candidate compound, can be accomplished in any vessel suitable for containing the reactants. Examples of such vessels include microtiter plates, test tubes, and micro-centrifuge tubes. In one embodiment, a fusion protein can be provided that adds a domain that allows one or both of the proteins to be bound to a matrix. For example, GST-ORX fusion proteins or GST-target fusion proteins can be adsorbed onto glutathione sepharose beads (Sigma Chemical, St. Louis, MO) or glutathione derivatized microtiter plates, that are then combined with the test compound or the test compound and either the non-adsorbed target protein or ORX protein, and the mixture is incubated under conditions conducive to complex formation (*e.g.*, at physiological conditions for salt and pH). Following incubation, the beads or microtiter plate wells are washed to remove any unbound components, the matrix immobilized in the case of beads, complex determined either directly or indirectly, for example, as described, *supra*. Alternatively, the complexes can be dissociated from the matrix, and the level of ORX protein binding or activity determined using standard techniques.

Other techniques for immobilizing proteins on matrices can also be used in the screening assays of the invention. For example, either the ORX protein or its target molecule can be immobilized utilizing conjugation of biotin and streptavidin. Biotinylated ORX protein or target molecules can be prepared from biotin-NHS (N-hydroxy-succinimide) using techniques well-known within the art (*e.g.*, biotinylation kit, Pierce Chemicals, Rockford, Ill.), and immobilized in the wells of streptavidin-coated 96 well plates (Pierce Chemical). Alternatively, antibodies reactive with ORX protein or target molecules, but which do not interfere with binding of the ORX protein to its target molecule, can be derivatized to the wells of the plate, and unbound target or ORX protein trapped in the wells by antibody conjugation. Methods for detecting such complexes, in addition to those described above for the GST-immobilized complexes, include immunodetection of complexes using antibodies reactive with the ORX protein or target molecule, as well as enzyme-linked assays that rely on detecting an enzymatic activity associated with the ORX protein or target molecule.

In another embodiment, modulators of ORX protein expression are identified in a method wherein a cell is contacted with a candidate compound and the expression of ORX mRNA or protein in the cell is determined. The level of expression of ORX mRNA or protein in the

presence of the candidate compound is compared to the level of expression of ORX mRNA or protein in the absence of the candidate compound. The candidate compound can then be identified as a modulator of ORX mRNA or protein expression based upon this comparison. For example, when expression of ORX mRNA or protein is greater (*i.e.*, statistically significantly greater) in the presence of the candidate compound than in its absence, the candidate compound is identified as a stimulator of ORX mRNA or protein expression. Alternatively, when expression of ORX mRNA or protein is less (statistically significantly less) in the presence of the candidate compound than in its absence, the candidate compound is identified as an inhibitor of ORX mRNA or protein expression. The level of ORX mRNA or protein expression in the cells can be determined by methods described herein for detecting ORX mRNA or protein.

In yet another aspect of the invention, the ORX proteins can be used as "bait proteins" in a two-hybrid assay or three hybrid assay (*see, e.g.*, U.S. Patent No. 5,283,317; Zervos, *et al.*, 1993. *Cell* 72: 223-232; Madura, *et al.*, 1993. *J. Biol. Chem.* 268: 12046-12054; Bartel, *et al.*, 1993. *Biotechniques* 14: 920-924; Iwabuchi, *et al.*, 1993. *Oncogene* 8: 1693-1696; and Brent WO 94/10300), to identify other proteins that bind to or interact with ORX ("ORX-binding proteins" or "ORX-bp") and modulate ORX activity. Such ORX-binding proteins are also likely to be involved in the propagation of signals by the ORX proteins as, for example, upstream or downstream elements of the ORX pathway.

The two-hybrid system is based on the modular nature of most transcription factors, which consist of separable DNA-binding and activation domains. Briefly, the assay utilizes two different DNA constructs. In one construct, the gene that codes for ORX is fused to a gene encoding the DNA binding domain of a known transcription factor (*e.g.*, GAL-4). In the other construct, a DNA sequence, from a library of DNA sequences, that encodes an unidentified protein ("prey" or "sample") is fused to a gene that codes for the activation domain of the known transcription factor. If the "bait" and the "prey" proteins are able to interact, *in vivo*, forming an ORX-dependent complex, the DNA-binding and activation domains of the transcription factor are brought into close proximity. This proximity allows transcription of a reporter gene (*e.g.*, LacZ) that is operably linked to a transcriptional regulatory site responsive to the transcription factor. Expression of the reporter gene can be detected and cell colonies containing the

functional transcription factor can be isolated and used to obtain the cloned gene that encodes the protein which interacts with ORX.

The invention further pertains to novel agents identified by the aforementioned screening assays and uses thereof for treatments as described herein.

Detection Assays

Portions or fragments of the cDNA sequences identified herein (and the corresponding complete gene sequences) can be used in numerous ways as polynucleotide reagents. By way of example, and not of limitation, these sequences can be used to: (i) identify an individual from a minute biological sample (tissue typing); and (ii) aid in forensic identification of a biological sample. Some of these applications are described in the subsections, below.

Tissue Typing

The ORX sequences of the invention can be used to identify individuals from minute biological samples. In this technique, an individual's genomic DNA is digested with one or more restriction enzymes, and probed on a Southern blot to yield unique bands for identification. The sequences of the invention are useful as additional DNA markers for RFLP ("restriction fragment length polymorphisms," described in U.S. Patent No. 5,272,057).

Furthermore, the sequences of the invention can be used to provide an alternative technique that determines the actual base-by-base DNA sequence of selected portions of an individual's genome. Thus, the ORX sequences described herein can be used to prepare two PCR primers from the 5'- and 3'-termini of the sequences. These primers can then be used to amplify an individual's DNA and subsequently sequence it.

Panels of corresponding DNA sequences from individuals, prepared in this manner, can provide unique individual identifications, as each individual will have a unique set of such DNA sequences due to allelic differences. The sequences of the invention can be used to obtain such identification sequences from individuals and from tissue. The ORX sequences of the invention uniquely represent portions of the human genome. Allelic variation occurs to some degree in the coding regions of these sequences, and to a greater degree in the noncoding regions. It is estimated that allelic variation between individual humans occurs with a frequency of about once

per each 500 bases. Much of the allelic variation is due to single nucleotide polymorphisms (SNPs), which include restriction fragment length polymorphisms (RFLPs).

Each of the sequences described herein can, to some degree, be used as a standard against which DNA from an individual can be compared for identification purposes. Because greater numbers of polymorphisms occur in the noncoding regions, fewer sequences are necessary to differentiate individuals. The noncoding sequences can comfortably provide positive individual identification with a panel of perhaps 10 to 1,000 primers that each yield a noncoding amplified sequence of 100 bases. If predicted coding sequences are used, a more appropriate number of primers for positive individual identification would be 500-2,000.

Predictive Medicine

The invention also pertains to the field of predictive medicine in which diagnostic assays, prognostic assays, pharmacogenomics, and monitoring clinical trials are used for prognostic (predictive) purposes to thereby treat an individual prophylactically. Accordingly, one aspect of the invention relates to diagnostic assays for determining ORX protein and/or nucleic acid expression as well as ORX activity, in the context of a biological sample (*e.g.*, blood, serum, cells, tissue) to thereby determine whether an individual is afflicted with a disease or disorder, or is at risk of developing a disorder, associated with aberrant ORX expression or activity. Disorders associated with aberrant ORX expression of activity include, for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

The invention also provides for prognostic (or predictive) assays for determining whether an individual is at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. For example, mutations in an ORX gene can be assayed in a biological sample. Such assays can be used for prognostic or predictive purpose to thereby prophylactically treat an individual prior to the onset of a disorder characterized by or associated with ORX protein, nucleic acid expression, or biological activity.

Another aspect of the invention provides methods for determining ORX protein, nucleic acid expression or activity in an individual to thereby select appropriate therapeutic or prophylactic agents for that individual (referred to herein as "pharmacogenomics").

Pharmacogenomics allows for the selection of agents (e.g., drugs) for therapeutic or prophylactic treatment of an individual based on the genotype of the individual (e.g., the genotype of the individual examined to determine the ability of the individual to respond to a particular agent.)

Yet another aspect of the invention pertains to monitoring the influence of agents (e.g., drugs, compounds) on the expression or activity of ORX in clinical trials.

These and other agents are described in further detail in the following sections.

Diagnostic Assays

An exemplary method for detecting the presence or absence of ORX in a biological sample involves obtaining a biological sample from a test subject and contacting the biological sample with a compound or an agent capable of detecting ORX protein or nucleic acid (e.g., mRNA, genomic DNA) that encodes ORX protein such that the presence of ORX is detected in the biological sample. An agent for detecting ORX mRNA or genomic DNA is a labeled nucleic acid probe capable of hybridizing to ORX mRNA or genomic DNA. The nucleic acid probe can be, for example, a full-length ORX nucleic acid, or a portion thereof, such as an oligonucleotide of at least 15, 30, 50, 100, 250 or 500 nucleotides in length and sufficient to specifically hybridize under stringent conditions to ORX mRNA or genomic DNA. Other suitable probes for use in the diagnostic assays of the invention are described herein.

One agent for detecting ORX protein is an antibody capable of binding to ORX protein, preferably an antibody with a detectable label. Antibodies directed against a protein of the invention may be used in methods known within the art relating to the localization and/or quantitation of the protein (e.g., for use in measuring levels of the protein within appropriate physiological samples, for use in diagnostic methods, for use in imaging the protein, and the like). In a given embodiment, antibodies against the proteins, or derivatives, fragments, analogs or homologs thereof, that contain the antigen binding domain, are utilized as pharmacologically-active compounds.

An antibody specific for a protein of the invention can be used to isolate the protein by standard techniques, such as immunoaffinity chromatography or immunoprecipitation. Such an antibody can facilitate the purification of the natural protein antigen from cells and of recombinantly produced antigen expressed in host cells. Moreover, such an antibody can be used to detect the antigenic protein (e.g., in a cellular lysate or cell supernatant) in order to evaluate

the abundance and pattern of expression of the antigenic protein. Antibodies directed against the protein can be used diagnostically to monitor protein levels in tissue as part of a clinical testing procedure, *e.g.*, to, for example, determine the efficacy of a given treatment regimen. Detection can be facilitated by coupling (*i.e.*, physically linking) the antibody to a detectable substance.

5 Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, β -galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, 10 fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I , ^{131}I , ^{35}S or ^3H .

Antibodies can be polyclonal, or more preferably, monoclonal. An intact antibody, or a 15 fragment thereof (*e.g.*, Fab or F(ab')_2) can be used. The term "labeled", with regard to the probe or antibody, is intended to encompass direct labeling of the probe or antibody by coupling (*i.e.*, physically linking) a detectable substance to the probe or antibody, as well as indirect labeling of the probe or antibody by reactivity with another reagent that is directly labeled. Examples of indirect labeling include detection of a primary antibody using a fluorescently-labeled secondary 20 antibody and end-labeling of a DNA probe with biotin such that it can be detected with fluorescently-labeled streptavidin. The term "biological sample" is intended to include tissues, cells and biological fluids isolated from a subject, as well as tissues, cells and fluids present within a subject. That is, the detection method of the invention can be used to detect ORX mRNA, protein, or genomic DNA in a biological sample *in vitro* as well as *in vivo*. For example, 25 *in vitro* techniques for detection of ORX mRNA include Northern hybridizations and *in situ* hybridizations. *In vitro* techniques for detection of ORX protein include enzyme linked immunosorbent assays (ELISAs), Western blots, immunoprecipitations, and immunofluorescence. *In vitro* techniques for detection of ORX genomic DNA include Southern hybridizations. Furthermore, *in vivo* techniques for detection of ORX protein include 30 introducing into a subject a labeled anti-ORX antibody. For example, the antibody can be

labeled with a radioactive marker whose presence and location in a subject can be detected by standard imaging techniques.

In one embodiment, the biological sample contains protein molecules from the test subject. Alternatively, the biological sample can contain mRNA molecules from the test subject or genomic DNA molecules from the test subject. A preferred biological sample is a peripheral blood leukocyte sample isolated by conventional means from a subject.

In one embodiment, the methods further involve obtaining a control biological sample from a control subject, contacting the control sample with a compound or agent capable of detecting ORX protein, mRNA, or genomic DNA, such that the presence of ORX protein, mRNA or genomic DNA is detected in the biological sample, and comparing the presence of ORX protein, mRNA or genomic DNA in the control sample with the presence of ORX protein, mRNA or genomic DNA in the test sample.

The invention also encompasses kits for detecting the presence of ORX in a biological sample. For example, the kit can comprise: a labeled compound or agent capable of detecting ORX protein or mRNA in a biological sample; means for determining the amount of ORX in the sample; and means for comparing the amount of ORX in the sample with a standard. The compound or agent can be packaged in a suitable container. The kit can further comprise instructions for using the kit to detect ORX protein or nucleic acid.

Prognostic Assays

The diagnostic methods described herein can furthermore be utilized to identify subjects having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. For example, the assays described herein, such as the preceding diagnostic assays or the following assays, can be utilized to identify a subject having or at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. Such disorders include for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

Alternatively, the prognostic assays can be utilized to identify a subject having or at risk for developing a disease or disorder. Thus, the invention provides a method for identifying a disease or disorder associated with aberrant ORX expression or activity in which a test sample is obtained from a subject and ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) is

detected, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. As used herein, a "test sample" refers to a biological sample obtained from a subject of interest. For example, a test sample can be a biological fluid (*e.g.*, serum), cell sample, or tissue.

Furthermore, the prognostic assays described herein can be used to determine whether a subject can be administered an agent (*e.g.*, an agonist, antagonist, peptidomimetic, protein, peptide, nucleic acid, small molecule, or other drug candidate) to treat a disease or disorder associated with aberrant ORX expression or activity. For example, such methods can be used to determine whether a subject can be effectively treated with an agent for a disorder. Thus, the invention provides methods for determining whether a subject can be effectively treated with an agent for a disorder associated with aberrant ORX expression or activity in which a test sample is obtained and ORX protein or nucleic acid is detected (*e.g.*, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject that can be administered the agent to treat a disorder associated with aberrant ORX expression or activity).

The methods of the invention can also be used to detect genetic lesions in an ORX gene, thereby determining if a subject with the lesioned gene is at risk for a disorder characterized by aberrant cell proliferation and/or differentiation. In various embodiments, the methods include detecting, in a sample of cells from the subject, the presence or absence of a genetic lesion characterized by at least one of an alteration affecting the integrity of a gene encoding an ORX-protein, or the misexpression of the ORX gene. For example, such genetic lesions can be detected by ascertaining the existence of at least one of: (i) a deletion of one or more nucleotides from an ORX gene; (ii) an addition of one or more nucleotides to an ORX gene; (iii) a substitution of one or more nucleotides of an ORX gene, (iv) a chromosomal rearrangement of an ORX gene; (v) an alteration in the level of a messenger RNA transcript of an ORX gene, (vi) aberrant modification of an ORX gene, such as of the methylation pattern of the genomic DNA, (vii) the presence of a non-wild-type splicing pattern of a messenger RNA transcript of an ORX gene, (viii) a non-wild-type level of an ORX protein, (ix) allelic loss of an ORX gene, and (x) inappropriate post-translational modification of an ORX protein. As described herein, there are a large number of assay techniques known in the art which can be used for detecting lesions in an ORX gene. A preferred biological sample is a peripheral blood leukocyte sample isolated by

conventional means from a subject. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

In certain embodiments, detection of the lesion involves the use of a probe/primer in a polymerase chain reaction (PCR) (*see, e.g.*, U.S. Patent Nos. 4,683,195 and 4,683,202), such as anchor PCR or RACE PCR, or, alternatively, in a ligation chain reaction (LCR) (*see, e.g.*, Landegran, *et al.*, 1988. *Science* 241: 1077-1080; and Nakazawa, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 360-364), the latter of which can be particularly useful for detecting point mutations in the ORX-gene (*see*, Abravaya, *et al.*, 1995. *Nucl. Acids Res.* 23: 675-682). This method can include the steps of collecting a sample of cells from a patient, isolating nucleic acid (*e.g.*, genomic, mRNA or both) from the cells of the sample, contacting the nucleic acid sample with one or more primers that specifically hybridize to an ORX gene under conditions such that hybridization and amplification of the ORX gene (if present) occurs, and detecting the presence or absence of an amplification product, or detecting the size of the amplification product and comparing the length to a control sample. It is anticipated that PCR and/or LCR may be desirable to use as a preliminary amplification step in conjunction with any of the techniques used for detecting mutations described herein.

Alternative amplification methods include: self sustained sequence replication (*see*, Guatelli, *et al.*, 1990. *Proc. Natl. Acad. Sci. USA* 87: 1874-1878), transcriptional amplification system (*see*, Kwoh, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA* 86: 1173-1177); Q β Replicase (*see*, Lizardi, *et al.*, 1988. *BioTechnology* 6: 1197), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques well known to those of skill in the art. These detection schemes are especially useful for the detection of nucleic acid molecules if such molecules are present in very low numbers.

In an alternative embodiment, mutations in an ORX gene from a sample cell can be identified by alterations in restriction enzyme cleavage patterns. For example, sample and control DNA is isolated, amplified (optionally), digested with one or more restriction endonucleases, and fragment length sizes are determined by gel electrophoresis and compared. Differences in fragment length sizes between sample and control DNA indicates mutations in the sample DNA. Moreover, the use of sequence specific ribozymes (*see, e.g.*, U.S. Patent No.

5,493,531) can be used to score for the presence of specific mutations by development or loss of a ribozyme cleavage site.

In other embodiments, genetic mutations in ORX can be identified by hybridizing a sample and control nucleic acids, e.g., DNA or RNA, to high-density arrays containing hundreds or thousands of oligonucleotides probes. See, e.g., Cronin, *et al.*, 1996. *Human Mutation* 7: 244-255; Kozal, *et al.*, 1996. *Nat. Med.* 2: 753-759. For example, genetic mutations in ORX can be identified in two dimensional arrays containing light-generated DNA probes as described in Cronin, *et al.*, *supra*. Briefly, a first hybridization array of probes can be used to scan through long stretches of DNA in a sample and control to identify base changes between the sequences by making linear arrays of sequential overlapping probes. This step allows the identification of point mutations. This is followed by a second hybridization array that allows the characterization of specific mutations by using smaller, specialized probe arrays complementary to all variants or mutations detected. Each mutation array is composed of parallel probe sets, one complementary to the wild-type gene and the other complementary to the mutant gene.

In yet another embodiment, any of a variety of sequencing reactions known in the art can be used to directly sequence the ORX gene and detect mutations by comparing the sequence of the sample ORX with the corresponding wild-type (control) sequence. Examples of sequencing reactions include those based on techniques developed by Maxim and Gilbert, 1977. *Proc. Natl. Acad. Sci. USA* 74: 560 or Sanger, 1977. *Proc. Natl. Acad. Sci. USA* 74: 5463. It is also contemplated that any of a variety of automated sequencing procedures can be utilized when performing the diagnostic assays (see, e.g., Naeve, *et al.*, 1995. *Biotechniques* 19: 448), including sequencing by mass spectrometry (see, e.g., PCT International Publication No. WO 94/16101; Cohen, *et al.*, 1996. *Adv. Chromatography* 36: 127-162; and Griffin, *et al.*, 1993. *Appl. Biochem. Biotechnol.* 38: 147-159).

Other methods for detecting mutations in the ORX gene include methods in which protection from cleavage agents is used to detect mismatched bases in RNA/RNA or RNA/DNA heteroduplexes. See, e.g., Myers, *et al.*, 1985. *Science* 230: 1242. In general, the art technique of "mismatch cleavage" starts by providing heteroduplexes of formed by hybridizing (labeled) RNA or DNA containing the wild-type ORX sequence with potentially mutant RNA or DNA obtained from a tissue sample. The double-stranded duplexes are treated with an agent that cleaves

single-stranded regions of the duplex such as which will exist due to basepair mismatches between the control and sample strands. For instance, RNA/DNA duplexes can be treated with RNase and DNA/DNA hybrids treated with S₁ nuclease to enzymatically digesting the mismatched regions. In other embodiments, either DNA/DNA or RNA/DNA duplexes can be treated with hydroxylamine or osmium tetroxide and with piperidine in order to digest mismatched regions. After digestion of the mismatched regions, the resulting material is then separated by size on denaturing polyacrylamide gels to determine the site of mutation. See, e.g., Cotton, *et al.*, 1988. *Proc. Natl. Acad. Sci. USA* 85: 4397; Saleeba, *et al.*, 1992. *Methods Enzymol.* 217: 286-295. In an embodiment, the control DNA or RNA can be labeled for detection.

In still another embodiment, the mismatch cleavage reaction employs one or more proteins that recognize mismatched base pairs in double-stranded DNA (so called "DNA mismatch repair" enzymes) in defined systems for detecting and mapping point mutations in ORX cDNAs obtained from samples of cells. For example, the mutY enzyme of *E. coli* cleaves A at G/A mismatches and the thymidine DNA glycosylase from HeLa cells cleaves T at G/T mismatches. See, e.g., Hsu, *et al.*, 1994. *Carcinogenesis* 15: 1657-1662. According to an exemplary embodiment, a probe based on an ORX sequence, e.g., a wild-type ORX sequence, is hybridized to a cDNA or other DNA product from a test cell(s). The duplex is treated with a DNA mismatch repair enzyme, and the cleavage products, if any, can be detected from electrophoresis protocols or the like. See, e.g., U.S. Patent No. 5,459,039.

In other embodiments, alterations in electrophoretic mobility will be used to identify mutations in ORX genes. For example, single strand conformation polymorphism (SSCP) may be used to detect differences in electrophoretic mobility between mutant and wild type nucleic acids. See, e.g., Orita, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA*: 86: 2766; Cotton, 1993. *Mutat. Res.* 285: 125-144; Hayashi, 1992. *Genet. Anal. Tech. Appl.* 9: 73-79. Single-stranded DNA fragments of sample and control ORX nucleic acids will be denatured and allowed to renature. The secondary structure of single-stranded nucleic acids varies according to sequence, the resulting alteration in electrophoretic mobility enables the detection of even a single base change. The DNA fragments may be labeled or detected with labeled probes. The sensitivity of the assay may be enhanced by using RNA (rather than DNA), in which the secondary structure is more

09747155-133400 sensitive to a change in sequence. In one embodiment, the subject method utilizes heteroduplex analysis to separate double stranded heteroduplex molecules on the basis of changes in electrophoretic mobility. *See, e.g., Keen, et al., 1991. Trends Genet. 7: 5.*

5 In yet another embodiment, the movement of mutant or wild-type fragments in polyacrylamide gels containing a gradient of denaturant is assayed using denaturing gradient gel electrophoresis (DGGE). *See, e.g., Myers, et al., 1985. Nature 313: 495.* When DGGE is used as the method of analysis, DNA will be modified to insure that it does not completely denature, for example by adding a GC clamp of approximately 40 bp of high-melting GC-rich DNA by PCR. In a further embodiment, a temperature gradient is used in place of a denaturing gradient
10 to identify differences in the mobility of control and sample DNA. *See, e.g., Rosenbaum and Reissner, 1987. Biophys. Chem. 265: 12753.*

Examples of other techniques for detecting point mutations include, but are not limited to, selective oligonucleotide hybridization, selective amplification, or selective primer extension. For example, oligonucleotide primers may be prepared in which the known mutation is placed
15 centrally and then hybridized to target DNA under conditions that permit hybridization only if a perfect match is found. *See, e.g., Saiki, et al., 1986. Nature 324: 163; Saiki, et al., 1989. Proc. Natl. Acad. Sci. USA 86: 6230.* Such allele specific oligonucleotides are hybridized to PCR amplified target DNA or a number of different mutations when the oligonucleotides are attached to the hybridizing membrane and hybridized with labeled target DNA.

20 Alternatively, allele specific amplification technology that depends on selective PCR amplification may be used in conjunction with the instant invention. Oligonucleotides used as primers for specific amplification may carry the mutation of interest in the center of the molecule (so that amplification depends on differential hybridization; *see, e.g., Gibbs, et al., 1989. Nucl. Acids Res. 17: 2437-2448*) or at the extreme 3'-terminus of one primer where, under appropriate
25 conditions, mismatch can prevent, or reduce polymerase extension (*see, e.g., Prossner, 1993. Tibtech. 11: 238*). In addition it may be desirable to introduce a novel restriction site in the region of the mutation to create cleavage-based detection. *See, e.g., Gasparini, et al., 1992. Mol. Cell Probes 6: 1.* It is anticipated that in certain embodiments amplification may also be performed using *Taq* ligase for amplification. *See, e.g., Barany, 1991. Proc. Natl. Acad. Sci. USA 88: 189.* In such cases, ligation will occur only if there is a perfect match at the 3'-terminus
30

of the 5' sequence, making it possible to detect the presence of a known mutation at a specific site by looking for the presence or absence of amplification.

The methods described herein may be performed, for example, by utilizing pre-packaged diagnostic kits comprising at least one probe nucleic acid or antibody reagent described herein, which may be conveniently used, *e.g.*, in clinical settings to diagnose patients exhibiting symptoms or family history of a disease or illness involving an ORX gene.

Furthermore, any cell type or tissue, preferably peripheral blood leukocytes, in which ORX is expressed may be utilized in the prognostic assays described herein. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

The invention will be further described in the following examples, which do not limit the scope of the invention described in the claims.

EXAMPLE 1: Cloning and analysis of ORX-like sequences in primates and mouse.

The isolation of ORX-related sequences has been described in Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. Briefly, 100 ng of genomic DNA from each species was subjected to PCR using consensus ORX primers OR5B-OR3B (OR5B (TM2), 5'-CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3' ; PMY(F/L)FL(S/A/T/G/C)NLS ; OR3B (TM7), (SEQ ID NO: 432) 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ ID NO:433) ; M(L/F/V/I)NPF(I/M)Y(S/C)L) (SEQ ID NO:434). See Ben-Arie et al., (1994) *Hum. Molec. Genet.* 3, 229-35. A second pair of consensus primers, OR3.1-OR7.1 (OR3.1 (TM3), 5'-GCIATGGCITA(C/T)GA(C/T)(A/C)GITA-3' (SEQ ID NO:435) ; AMAYD(S/R)Y (SEQ ID NO:436) ; OR7.1 (TM7), 5'-A(A/G)I(G/C)(A/T)(A/G)TA(A/G/T)AT(A/G)AAIGG(A/G)TT-3' (SEQ ID NO:437); NPMY(S/R/T/C/W)(L/F)(SEQ ID NO:438), was also used to amplify primate ORX sequences. See Freitag et al. (1998) *J. Comp. Physiol.* 183, 635-50 and Freitag et al., (1999) *Gene* 226, 165-74.

PCR products were subcloned in the TA vector (InVitrogen), and recombinant clones were identified by PCR. Sequencing of the ORX sequences was performed and sequences were assembled and analyzed. The following species were studied: human (*Homo sapiens*, HSA), chimpanzee (*Pan troglodytes*, PTR), gorilla (*Gorilla gorilla*, GGO), orangutan (*Pongo pygmaeus*, PPY), gibbon (*Hylobates lar*, HLA), macaque (*Macaca sylvanus*, MSY), baboon (*Papio papio*, PPA), marmoset (*Callithrix jacchus*, CJA), squirrel-monkey (*Saimiri sciureus*, SSC, and *Saimiri boliviensis*, SBO), lemur (*Eulemur fulvus*, EFU, and *Eulemur rubriventer*, ERU), and mouse (*Mus musculus domesticus*, MMU). In addition, a few zebrafish (*Danio rerio*, DRE) sequences were also characterized using primers OR3.1-OR7.1.

Pairwise sequence comparisons and multiple alignments were performed using Gap and PileUp from the GCG package (Wisconsin Package version 8).

EXAMPLE 2: Construction and screening of an ORX-specific mouse sublibrary.

Mouse ORX clones obtained by PCR as described above were gridded in 96-well microtiter dishes (1536 clones in 8 plates). For hybridization screening, the clones were robot-spotted in duplicate on high-density filters as described in Rouquier et al. (1999) *Mamm. Genome* 10, 1172-75.. Approximately 90% of the clones were identified as ORX genes. This library was screened to identify clones hybridizing to human ORX pseudogene sequences. Human plasmid DNA probes were radiolabeled to a specific activity of 108-109 cpm/ μ g by random hexamer priming using (-32P)-dCTP (Amersham) as described in Feinberg et al. (1983) *Anal. Biochem.* 132, 6-13. Filter hybridizations were carried out under standard hybridization conditions, and exposed to Kodak X-ray film at -80°C. See Rouquier et al., (1993) *Genomics* 17, 330-40.

Three human ORX probes were used: OR1-72, OR912-47, OR15-71 (DDBJ/GenBank accession numbers U86218, U86230, U86296 respectively).

EXAMPLE 3: Sequence analysis of mouse ORX sequences.

To test whether mammals thought to be microsmatic or macrosmatic differ in the fraction of pseudogenes in their ORX repertoire, the ORX sequences in the mouse genome were surveyed. A mouse sublibrary enriched for ORX-related sequences amplified by PCR from the mouse genome was constructed, and nineteen randomly selected mouse ORX clones were sequenced. All 19 have an uninterrupted open-reading frame (ORF) and are potentially functional. These sequences group primarily in family 1 and vary from ~52 to >99% NSI. In addition, in an attempt to bias in favor of selecting mouse ORX pseudogenes, a search for mouse ORX sequences homologous to human pseudogenes was performed. One member was chosen from three different ORX pseudogene families: clones 1-72, 15-71 and 912-47 from chromosomes 1, 15 and 11, respectively. *See Rouquier et al., (1998) Nature Genet. 18, 243-50.* Each of these genes belongs to one of the 3 main groups of human ORX sequences and has accumulated a number of mutations such as stop codons and indel frameshifts. *See id.* The amino-acid sequence identity between these three ranges from 31% to 41%.

High density filters from the mouse ORX sublibrary were then hybridized separately with the three human pseudogene probes at a high stringency. Fourteen clones were sequenced on both strands. These sequences showed 38% to 53% ASI to the human sequences used to select them, indicating that they are not the orthologs of the human pseudogenes. All have an uninterrupted ORF from TM2 to TM7. Together, 33 mouse ORX sequences were sequenced, none of which contained characteristic features of pseudogenes.

OTHER EMBODIMENTS

While the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims.